American Druggist

Vol. XIII. No. 9. NEW YORK, SEPTEMBER, 1884. Whole No. 123.

[ORIGINAL COMMUNICATION.]

THE MANUFACTURE OF SUGAR OF MILK IN SWITZERLAND.

BY J. KUNZ, CHEMIST.

1. *The Chemistry and Commerce of Milk-Sugar.*

Sugar of milk is a regular constituent of the milk of all mammals. Horses' and asses' milk usually contains 6 per cent and over, cows', goats', and sheeps' milk between 4 and 5 per cent, and hogs' milk 3 per cent. Woman's milk contains less albuminoids and fat than cows' milk, but a larger proportion of sugar of milk: on an average 6 per cent.

Owing to its comparatively difficult solubility and its great readiness to crystallize, sugar of milk may easily be obtained in a pure condition, and indeed such as it appears in the market, it is one of those commercial chemicals that most nearly approach purity.

If sugar of milk is crystallized by *cooling* its aqueous solution, and afterwards dried, the crystals contain 5 per cent, or 1 molecule, of water: $C_{12}H_{22}O_{11}.H_2O$. On the other hand, if it crystallizes during *evaporation*, the crystals are anhydrous: $C_{12}H_{22}O_{11}$, a circumstance which has formerly often been overlooked in calculating the results of milk analyses.

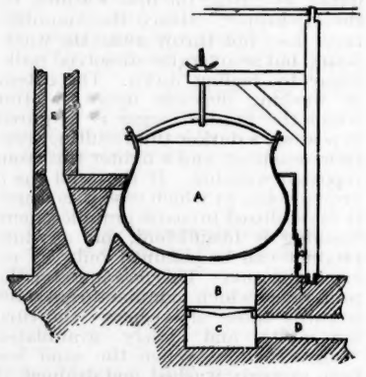

FIG. 1.—CHEESE-KETTLE.

A, kettle; B, fire-place; C, ashpit; D, draught-hole; E, chimney; F, turning crane for swinging the kettle from the fire.

When long kept in dry, warm rooms, crystallized sugar of milk loses any moisture mechanically inclosed by the crystals. For this reason, old stock is always preferred to new. Unseasoned milk-sugar is apt to become sticky during powdering, and as it easily becomes warm during this operation, often turns into a tough caoutchouc-like mass. On the other hand, if the milk-sugar was properly dried, no such disagreeable results will occur.

One of the first steps in the manufacture of milk-sugar is the removal of albuminoids and fat. The more complete the separation of the latter, the more easy will be the crystallization of the sugar. On this account, we find the manufacture of milk-sugar almost exclusively combined with that of "Swiss" cheese, particularly in the Alps, where the uniform method of feeding, the low temperature of the air, and the fact that the milk is usually worked up for cheese at its place of production, combine in facilitating an almost complete separation of the various constituents of the milk.

Though comparatively insignificant, alongside of the production of cheese and butter, yet the manufacture of milk-sugar has gradually grown up and become almost localized in the cantons of Berne and Luzerne. According to the statements of some manufacturers there residing, sugar of milk has been produced there, as a commercial article, during the past 400 years.

The first customer was Italy, which even to-day consumes considerable quantities for medicinal purposes—for instance, in the preparation of a popular laxative made from sugar of milk and lemon-juice.

At the present day, England and the United States are the chief consumers of milk-sugar, it being largely used there in homœopathic as well as in allopathic practice, and also reported as being frequently employed as an addition to milk for feeding babies.* Upon the Continent of Europe, cane-sugar is usually employed, instead of milk-sugar, on account of its being cheaper than the latter, the advantages of which, in other respects, are of course well recognized.

For technical purposes, milk-sugar never acquired much importance. It has been employed in the preparation of lactic acid, in silvering, and to a slight extent for making caramel.

Its consumption is remarkably uniform, while its production and value are the very reverse, fluctuating quite considerably. When the price is high, there is always an excess of production; in consequence of this, a sudden decline takes place, which again induces the manufacturer to reduce his output as much as possible, or to stop production altogether, until he can resume it with some hope of profit.

2. *The Manufacture of crude Milk-Sugar or "Sugar-sand."*

The manufacture of milk-sugar is carried on almost exclusively in two stages:

1. Preparation of "sugar-sand" (*Zuckersand*), and
2. Crystallization,

which are usually effected in different localities and by different persons.

The manufacture of "sugar-sand" is carried on in the same Alps of the Swiss Cantons of Berne, Freiburg, and Lucerne which produce the best Swiss cheese. According to the locality, the whey to be worked at one time differs in quantity between 300 and 1,000 liters (ab. 80 to 260 gall.). Every morning the milk just collected, as well as that of the previous evening, is poured from the milk-pails directly into the "cheese-kettles." When the casein has been separated, the remaining whey is heated to boiling, whereby a cream-like skin is formed on top, which is made to increase in quantity by the rapid addition of acidified whey ("whey-vinegar"). The skin (dialectic: "Vorbruch") is skimmed off and worked for butter. The addition of the acidified whey produces a partial separation of the albuminoids ("Zieger") from the whey, and the butter-fat is at the same time more completely raised to the surface.

Next follows the separation proper ("breaking") of the whey by the addition of more of the acidified liquor, about 15 liters for every 500, and gradual heating to incipient boiling. If this process is properly performed, the albuminoids will now rise to the surface in large lumps, the whey* will lose its white color and appear as a limpid, greenish liquid ("Schotte") covered with the coagulated albuminoids. The latter is skimmed off and the liquid portion transferred into the "sugar-kettle." The quantity of whey ("Schotte") amounts to about 70 per cent of the original milk.

Figure 1 of the accompanying illustrations shows a "cheese kettle" suspended from a crane so as to permit its being quickly removed from the fire at the proper moment. These copper kettles are always imbedded more than one-half in the fire-place. For boiling down ("sand-boiling," *Sandkochen*), kettles with very flat bottom are selected, and these are permanently set in the stone-work as shown in Fig. 2, in such a way that the fire can touch only the bottom. This arrangement prevents the fire from coming in contact with any portion of the kettle above the contents, which would rapidly burn or blister the copper. Sometimes two such kettles are set up over one fire-hearth. Grates are not used under any of these kettles in the Alps.

The mason-work consists of stones held together by clay. As may naturally be supposed, only wood is used as fuel, in form of roughly split logs or roots. Its consumption is so great that the boiling of the sugar can only be carried on profitably in those Alps where there is an abundance of forests. But in some places, even there, the industry is forbidden on account of its consuming wood required for domestic or other purposes.

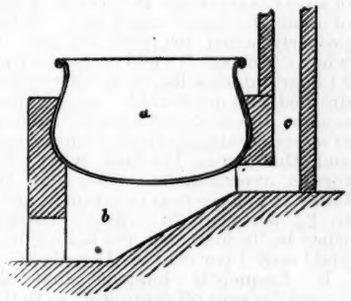

FIG. 2.—SUGAR-KETTLE.

a, kettle; *b*, fire-place; *c*, chimney.

Five-hundred liters (132 gall.) of whey ("Schotte") require, for boiling down, 1 cubic meter (1.3 cub. yard) of logs. The boiling in the sugar kettle is continued day and night, without intermission; as soon as the contents of the kettle have been removed, it is immediately charged with a new quantity of whey ("Schotte").

The boiling reduces each charge to about one-fifteenth of its original bulk, and leaves a brown, viscid, sweetly saline mass, the condition of which is judged from the manner in which a sample drops from a dipper. When it has arrived at the proper degree of concentration, it is dipped out into a tub where the sugar will crystallize

* During the year 1878, I put on the market a new preparation, under the name of *Lactin*, which contains, besides milk-sugar, suitable proportions of those salts in which cow's milk is deficient when compared with woman's milk. Hence this preparation, if mixed with cow's milk, furnishes a product as closely as possible imitating woman's milk. This preparation has found much favor in Switzerland; but its introduction in other countries has been retarded or interfered with by worthless imitations.

* The author of the paper employs the term "Molken" in the ordinary sense of the English *whey*, being the whitish opalescent liquid remaining after the separation of the casein. This liquid, after further treatment to separate the albuminoids and the remainder of the fat still present, finally yields a transparent, greenish liquid which the author terms "Schotten" or "Schotte." This name is often used promiscuously as a synonym for whey. But in the special sense in which the author uses it, there is no English equivalent. We have translated it in doubtful cases by "whey (Schotte)." — ED. AM. DRUGG.

out after twenty-four to forty-eight hours, if the operation was properly conducted. The salts remain in solution, but the "sand" (crystallized sugar) retains a sharp saline taste, which is removed by stirring it with a sufficient amount of very cold water, allowing to settle, and decanting the liquid. The "sand" will then have acquired a bright-yellow, almost white color. It is now filled into a sack from which the excess of water still retained by it gradually drains off. As soon as a sack is filled—which depends on the quantity of whey operated on, and may require from two to eight days—it is carried down into the valley and sent to the refiner, who goes by the usual appellation of sugar-manufacturer ("Zuckerfabrikant"). Sometimes the whole of one summer's turnout of "sugar sand" is sold or contracted for in advance.

The strongly saline, residuary liquids constitute an excellent fertilizer, being rich in potash and phosphoric acid. They contain every inorganic constituent necessary for the growth of plants, and are therefore as perfect a nourishment for the latter, as the milk itself is for man.

The quality of the whey ("Schotte")—which should above all be clear and sweet—the manner of setting the kettles, and the whole manipulation of the boiling, all have a share in the success or failure of the process. It happens not unfrequently that the Alpine operator is compelled to give up the work altogether.

When the boiling is badly managed, the syrup in the kettle throws up foam, its volume, in spite of the continued boiling, becomes greater, and it acquires a darker color. On cooling such a syrup, it yields a jelly-like mass, intermingled with but a small quantity of sugar crystallized in form of grains of about the size of small shot. When properly boiled, 100 liters (26½ gall.) of whey ("Schotte") yield on an average 3 kilogrammes (6 lbs. 9¾ oz.) of washed, drained, and marketable "sand." There is some difference between the amount of sugar obtainable from Alpine whey, and that from low-land whey; the former averaging 3 to 4 per cent, the latter 2½ to 3 per cent in summer, and 2 to 2½ per cent in winter; though, when badly managed, the boiling may yield only ½ per cent or thereabouts.

It frequently happens that the "sand" is sent off quite wet, so that it begins to drip again during the transport. In this case, it still contains from 15 to 20 per cent of water. Since it readily becomes mouldy while wet, it is important that it should reach the refiner as soon as possible. In consequence of the dripping and the evaporation of moisture, the weight of the "sand," when delivered, is always less than when shipped; hence it is customary to settle in the contract where and by whom it is to be weighed. If it is sent by rail, the railway weigher's figures at the place of destination are usually taken as standard.

The price of "sugar-sand" varies, according to the quality and the rate of demand between 70 and 160 francs per 100 kilos (14 to 32 dollars per 220 lbs.)

3. The Refineries of Milk-Sugar.

There are five manufacturers, that is, refiners of milk-sugar, in the Canton of Luzerne, all of them located in the same village, Marbach, where this industry seems to have sprung up originally, and where it has been transmitted as an heirloom in the same families. These manufacturers are at the same time peasants or tavern-keepers, carrying on the manufacture only during the summer, mostly with their own hands or their own people. When they are compelled to employ help, they usually engage a weak-minded or half-witted fellow, for the sake of preserving the secret of their process.

According to the demand and price of the sugar, the manufacturers buy or contract for the "sugar-sand," in the spring, from the Alp-keepers, in larger or smaller quantities, at higher or lower prices, for the ensuing summer. These bargains are concluded with a closeness and secrecy which is quite characteristic of these people: neither the seller nor the purchaser will ever divulge the contract price agreed upon. Neither is the purchase of the refined sugar from these people a simple or pleasant job. To a verbal question: "At what price do you sell?" the answer may be returned: "Likely, you know the price well enough, as you have been around to other manufacturers already."—"How much have you to sell?"—"Think I shall have enough to satisfy you," etc., etc. Moreover, it is quite a task to obtain a sight of a sample.

Besides these aristocrats among the manufacturers, there are perhaps three other, more recently established sugar manufacturers in Switzerland (one of these I have been myself, up to two years ago), who manufacture a purer quality of milk sugar, in whiter and larger crystals, in order to be able to compete with the former.

The old manufacturers produce, together, about 50,000 to 60,000 kilos (110,000 to 130,000 pounds), the new ones perhaps an equal quantity; hence, the total yearly product, in Switzerland, amounts to 100,000 to 120,000 kilos (220,000 to 264,000 pounds), at a value of 200 to 300 francs per 100 kilos (40 to 60 dollars per 220 pounds); sometimes also ruling lower.

Outside of Switzerland, sugar of milk is produced only in scattered localities in Austria, Italy, France, and Germany; but the quantity produced in all these countries amounts to at most only one-third of that produced in Switzerland. A very white milk sugar, "Saccharum Lactis Germanicum," is made in Silesia (Germany), which is, however, said to be, for the most part, recrystallized Swiss sugar. This extra-fine, white article, which used to bring about fifty per cent more in price, is at present almost completely displaced by the first quality of Swiss sugar, which is at the same time cheaper. The Italian manufacture has not been able to survive, in spite of many experiments, and even under the protection of a considerable duty. In the Austrian Alpine province of Tyrol, and in the French province of Savoy, it is carried on but sparingly, not even the home demand being fully supplied. There is a factory in Savoy, working with a Piccard's evaporating-apparatus, in which the steam arising from the evaporation of the whey ("Schotte") is compressed, by means of a pump, in a copper-worm situated in the kettle, where it becomes condensed and thereby gives out the requisite amount of heat for producing an equal weight of new steam from the whey ("Schotte"). Although this system is economical and of advantage in other lines of manufacture, it is unsuited for the preparation of milk sugar. In the first place, it requires a large outlay for steam-boiler, water-power (or steam-engine), and evaporating-apparatus. In the second place, a profit can be expected only if a very large quantity of whey—say 5,000 to 10,000 liters (1,300 to 2,600 gall.) per day—can be expected to be delivered. I say "expected" on purpose, because the delivery itself is connected with further difficulties. To obtain such a large quantity of whey, it must be brought together from a large number of different cheese works, some of them at a distance of perhaps ten kilometers (six miles), which increases the expense. And a single lot of whey from abnormal milk accidentally mixed with the rest may spoil the whole quantity.

According to my own extensive experience, the yield and quality of product depends also a good deal on the kind of vessels used for boiling, on the quantity of whey boiled at one time, and the time consumed in boiling, and I have found that none of the requisite conditions are fulfilled by using Piccard's apparatus. I am acquainted with the latter, through inspecting a factory in the Canton of Freiburg which failed three years ago. This factory was said to be an exact copy of that in Savoy, and only worked for a short time; as soon as capital ceased to find attraction to it, it collapsed, with liabilities amounting to 80,000 francs.

A number of years ago, I established works, at an expense of 5,000 francs, for boiling down a daily quantity of 2,000 to 3,000 liters (520 to 790 gall.) of whey ("Schotte") and refining the sugar, and I kept my works going summer and winter, employing some times even the whey ("Schotte") obtained from makers of Limburg cheese. Since my apparatus was built with a view of using steam, I erected them in connection with steam cheese works, saving thereby the special erection of a boiler. My yearly output amounted to 10,000 kilos (22,000 pounds), and found ready purchasers, particularly for the United States. Since my engagement in another branch of technical chemistry, my works and apparatus have remained unused, since I have not yet been able to make up my mind to dispose of my experience.

4. The Refining of Milk-sugar.

Immediately after arrival at the factory, the "sugar-sand" is rewashed, and then allowed to drain. The wash-water dissolves a considerable quantity of the sugar, the latter being no longer imbedded in or enveloped by the saline and sticky mother liquid, as during the first washing by the alp-keeper. Hence the manufacturer does not throw away the wash-water, but recovers the dissolved milk-sugar by boiling down. The extent of washing depends upon the tint which the finished sugar is required to possess, a darker tint resulting from short washing, and a lighter tint from repeated washing. If the sand has a brown color, in which case it is usually crystallized in coarse granules, mere washing is insufficient, and a white product can be obtained only by recrystallization. This accounts for the preference which manufacturers show towards those alp-keepers who turn out white and finely granulated "sugar-sand." When the sand has been properly washed and drained, it is dissolved in water, in a kettle set like that previously described, and more of it is gradually added, until the solution has acquired the density most favorable for crystallization. This is not recognizable by the eye as readily as the end of the operation in boiling down the whey ("Schotte"); nevertheless the old manufacturers do not use any areometers. Usually a quantity of dark-colored crystallized milk-sugar (recovered from the mother-liquors) is dissolved at the same time with the other. During solution, a dirty foam rises to the surface, which is constantly removed, until finally only a slightly tinted skin forms on top. In order to insure the more complete separation of impurities, it is customary to add some clarifying substances. As soon as the solution has attained the proper condition of purity and concentration, it is transferred, while still boiling hot, into copper-lined or solid copper vessels, which may be of any size and form.

Discarded cheese-kettles, of a capacity of 200 to 1,000 liters (50 to 260 gall.), are often employed for this purpose; or old stills, or square wooden boxes lined with copper, etc. Smaller vessels, of a capacity of 300 liters (80 gall.) and less, are embedded in wood ashes, whereby the cooling is retarded, and its rate made more regular than

when it is freely exposed. The crystals thus obtained from the smaller vessels will then turn out to be as well formed as those obtained from the larger. For the purpose of getting handsome crystalline groups, it is necessary to provide for a sufficient number of crystallizing "points," which is done by hanging into the liquid sticks of wood of the diameter of a goose-quill, which are stuck, in intervals of about 12 Cm. (4¾ inch.), through holes in a frame laid across the top of the vessel. Concentrated solutions, of course, yield a larger quantity of crystals than more dilute ones. If an equal number of sticks be placed into two solutions differing only in density and contained in equal-sized vessels, the thinner liquid will yield thinner plates of crystals at the sides and bottom and "grapes"* of lesser diameter than the thicker solution. But the product, in the former case, is lighter colored than in the latter. The size of the single crystals, or in other words, the grain, depends on the rapidity of cooling and the clearness of the solution. After about ten days, the crystallization is completed; the mother-liquid is then drawn off, which must be done rapidly, since the motion into which it is put by drawing off causes it to deposit a further quantity of milk-sugar in powder, which is apt to spoil the handsome appearance of the crystals. The sugar is now washed with fresh water, and then dried at a moderate temperature, which must be done thoroughly, otherwise the sugar will become mouldy. The crystalline plates taken from the bottom of the vessels require to be further purified, since they contain at their under surface any impurities which had settled to the bottom before the crystallization began. This impure layer is chopped off the pieces with a hatchet.

The mother-liquid is again concentrated to the crystallizing point, and treated exactly as at first. The second crystallization yields a darker-colored finely crystalline product, which is always re-dissolved along with a fresh lot of crude sugar. The mother-liquid left after this second crystallization is boiled down to "sand;" but this is usually of so impure a character that it must be subjected to a preliminary purification before it can be utilized for obtaining marketable sugar.

All attempts to manufacture crystalline milk-sugar directly from the whey ("Schotte"), on the principle of making loaf-sugar from beet-juice, have failed to lead to practical results. The difficulty is this, that not only the whole of the albumen and fat, but also the milk-salts and the lactic acid must be removed, and that the milk-salts which, by their presence, interfere greatly with the crystallization of the sugar, amount to one-half per cent in the whey ("Schotte"), or to ten per cent of the weight of the sugar itself.†

Still more impracticable appears the proposition to precipitate the milk-sugar in the whey ("Schotte") by alcohol. In the first place, at least *four* volumes of alcohol would be required for precipitating it in *one* volume of whey; and further, the precipitate would be contaminated by accompanying albuminoids, and would, therefore, have to be purified. Besides, a considerable amount of fuel would have to be consumed for the recovery of the alcohol, and more or less of the latter would be lost.

The manufacture of milk-sugar, like that of maple sugar, with which it has many points in common, is not capable of being locally centralized beyond a certain limit. Besides other impediments already mentioned, an additional one is the limited consumption of the product. Until this has acquired much larger proportions, it is probable that the opinion of an old manufacturer, that "Sugar-making is profitable only where the manufacturer is his own workman," will maintain its authority.

BASLE, May 18th, 1884.

* This is the long corn-cob-shaped mass of crystals attached to the sticks.—ED. AM. DRUG.

† One hundred parts of whey contain:

Milk-sugar	4.5 to 5.0
Lactic Acid	0.2 " 0.5
Nitrogenized Substances and Fat,	0.5 " 1.0
Salts	0.5 " 0.7
Water	94.2 " 92.8

The spec. grav. of the whey is 1.026 to 1.028.

[ORIGINAL COMMUNICATION.]

DECOLORIZED TINCTURE OF IODINE.

BY R. ROTHER.

THERE probably never was a pharmacist who believed that colorless tincture of iodine retains its original properties unchanged, excepting in its relations to light. But it is nothing unusual or surprising to find others, who entertain such an opinion. At one time this preparation had an extensive demand owing to this misbelief. Being found on trial entirely destitute of the characteristic effects of the regular tincture of iodine, it speedily fell out of use. It is, however, possessed of certain qualities which render it valuable for some purposes, and hence the German Pharmacopœia has given it official recognition. According to this authority it is not prepared by the method originally in vogue. Its process consists in reacting upon iodine with sodium thiosulphate in the presence of water, then adding a slight excess of ammonia and finally alcohol. This form of tincture soon develops a very unpleasant and persistent sulphury odor, which interferes with its more general use. In this country the primitive process was retained, but owing to its several disadvantages, physicians began to prescribe a mixture of sodium sulphite and tincture of iodine. The result of such a combination is sodium sulphate which precipitates, and iodhydric acid, which remains in solution when one molecule of sodium sulphite and two molecules of iodine, that is equal weights of the reagents, are employed, thus:

$$Na_2SO_3 + I_2 + OH_2 = Na_2SO_4 + 2HI$$

When, however, the ingredients are compounded in the proportion of one part of iodine and two parts of the sulphite, which is the case where one drachm of the sulphite is added to one fluid ounce of the tincture, then sodium sulphate, sodium iodide, and sulphurous oxide result, as follows:

$$2(Na_2SO_3) + I_2 = Na_2SO_4 + 2\,NaI + SO_2$$

It is therefore evident that in either case an extremely irritant body is generated; in the first instance, the free iodhydric acid, and in the second, the even more objectionable sulphurous oxide.

These considerations show that the defects of the various methods must first be overcome before colorless tincture of iodine can attain any degree of popularity in medicine.

The writer believes that a solution of this problem is effected by combining the good features of all these methods.

Firstly, iodine is the characteristic and invariable element of all, and therefore, must constitute the basis of the new process.

Secondly, sodium sulphite is the next most important agent, and although slightly variable through oxidation, is perfectly satisfactory, since a sufficiency is indicated by the discharge of color, and an excess is practically excluded from the finished preparation, by its sparing solubility in alcohol.

Thirdly and lastly, ammonia is the necessary requisite to abolish the acidity, and prevent other changes. But the alkali itself is objectionable; firstly, owing to its indefiniteness and the insuperable volume of water it introduces. And secondly, by reason of the fact that, in the presence of free iodine, it gives rise to iodic acid, whose monad salts are insoluble in alcohol. Hence, the carbonate presents itself as the appropriate form which in the condition of bicarbonate leaves nothing to be desired. Since, however, the ordinary carbonate is usually the only available salt, recourse must be had to this. It is generally quite indefinite, owing to the continually increasing proportion of bicarbonate due to the dissipation of ammonia. Consequently an excess above the calculated amount will always be needed. But since the bicarbonate is insoluble in alcohol, in which the normal carbonate and carbamate are soluble, no undesirable excess is liable to occur in the finished tincture. The Pharmacopœia states that the official or ordinary "Ammonii Carbonas" is a chemical compound of one molecule of each of ammonium carbamate and bicarbonate. That it is a single body, and not a mixture is evident from its translucence and homogeneousness. But that it is chemically constituted as officially indicated is doubtful. It is possible enough, but under the circumstances highly improbable, that two such discordant bodies should coalesce to form a double salt. Various chemical considerations, and the conditions under which "Ammonii Carbonas" is formed, show that it has a much more rational and simpler constitution. When calcium carbonate and ammonium chloride are heated together, carbonic oxide (CO_2) and ammonia (NH_3) are produced. These combine to form carbamic acid, which at the moment of its generation unites with another molecule of ammonia, and yields ammonium carbamate. This compound in the presence of water absorbs one molecule of it, and is converted into normal ammonium carbonate. When, however, ammonium carbamate is heated under pressure, one molecule of it parts with a molecule of water to another, and forms ammonium carbonate as before, together with carbamide or urea. Now when urea is subjected to heat, it is converted into ammonia and cyanuric acid, which latter, when further heated, is transformed into cyanic acid without decomposition. But cyanic acid in contact with water is changed into ammonium bicarbonate. We have then in the process for making "Ammonii Carbonas" the precise agencies necessary for the abundant and simultaneous production of urea and ammonium bicarbonate, together with aqueous vapor. Since ammonium carbamate is equivalent to urea and water, the formula of the official salt will be equal to one molecule of urea, one molecule of ammonium bicarbonate, and one molecule of water. Now, although urea is potentially dibasic, it is only known to present one basic affinity. If for convenience we write Ur for urea, and H_2Oc for oxalic acid, the formulas of the nitrate and oxalate will respectively be Ur HNO_3 and Ur_2H_2Oc. Urea forms no carbonate so far as known, but the assumption is valid of its entering into combination to produce a double salt. Hence the official "Ammonii Carbonas" may be formulated as a hydrous carbonate of ammonium, and of urea thus: Am Ur H_2CO_3. Aqu. or $NH_2—CO—NH_3CO_3NH_4$. Aqu. It will be noticed that this formula is in perfect accordance with the simple salts of urea, the amidogen group uniting with the acid molecule, and rendering the nitrogen pentadic just as in the ammonium salts, and salts of the compound ammonias in general. The writer has already applied the termination *ium* to these, as for instance quinium chloride and propylaminium sulphate (*Pharmacist*, January, 1882, and *American Journal Pharmacy*, Dec., 1883), and now also extends its use to the amides. Accordingly "Ammonii Carbonas" is a hy-

drite of ammonium and carbamidium carbonate.

When iodine, sodium sulphite, and ammonium carbonate react in the presence of water, sodium sulphate and ammonium iodide remain in solution, whilst the carbonic anhydrate escapes. The subsequent addition of alcohol precipitates the sodium sulphate, and the tincture then contains only ammonium iodide, and a little normal ammonium carbonate. In preparing the tincture, the alcohol may be added several ounces short of the whole amount, the mixture then be poured into a filter, and followed with alcohol until the desired measure is obtained. In this manner a slight precipitate always occurs when the measure is completed and requires a second filtration. Therefore, the writer prefers to strain out the precipitate and mix it with a sufficiency of alcohol, which on straining off shall complete the measure. From these observations the following practical and expeditious process is deduced, for a tincture containing one troy ounce of iodine in the pint.

Iodine..... ....1 troy ounce
Sodium Sulphite,
Ammonium Carbonate,
Alcohol, ...of each sufficient
Water.....2 fluid ounces

Upon one troy ounce of sodium sulphite, and 200 grains of ammonium carbonate, each previously powdered, pour the water, and then gradually add the iodine until its color is no longer discharged. If now the effervescence has ceased, add ammonium carbonate in proportion to the remaining iodine, but if ammonium carbonate still predominates, then add sodium sulphite in proportion to the surplus of iodine, and continue the incorporation of the iodine until all has been added, and a faintly yellow solution results, whilst some sulphite and carbonate remain in excess. Now gradually add alcohol with constant stirring until the mixture measures 12 fluid ounces. Pour this upon a muslin strainer, press the liquid out, and measure it. Mix the solid residue with enough alcohol to make the measure of a pint when united with the first expression, then press the liquor out, mix it with that first obtained, and filter the tincture through paper.

DETROIT, July 18th, 1884.

Treatment of Sea-sickness.

T. T. REYNOLDS, the surgeon of a transatlantic steamer, speaks favorably of the use of drop doses of the liq. atropiæ sulphatis (Ph. B.) in a teaspoonful of water, and given hourly until the physiological effects of the drug appear. This is serviceable only when used early in the malady, and may be accompanied by drachm doses of equal parts of brandy and iced water, or iced lemonade when there is dryness of throat from the effects of the atropine.

Speaking of the use of the bromides in large doses (90 grains per diem), as recommended by the late Dr. G. M. Beard, Dr. Reynolds mentions several instances in which much harm has resulted; delirium, followed by impotence and incapacity for business of considerable duration, being the most notable results.

Pills of Permanganate of Potassium.

A RUSSIAN pharmacist recommends the following formula:

Vaseline..... 1 part
Paraffin, White wax } of each.. 2 parts
Fuller's earth..... 3 "

Melt the first three together, and add the "white bole" when the mixture is cold. Add to this the permanganate, previously powdered in a mortar, and roll out with a pill machine made of horn or wood.

[ORIGINAL COMMUNICATION.]

Precipitates in Fluid Extracts.*

BY J. U. LLOYD.

IN my last paper I was led to bring forward an experiment, wherein by evaporating a solution of a mixture of the salts, chloride of sodium and chloride of ammonium, a separation of these substances was effected—one (chloride of sodium) being deposited near the bottom of the evaporating dish; the other (chloride of ammonium) being mostly deposited at the surface of the liquid, or even above the surface line, by the familiar creeping process. The examination of these deposits demonstrated that the lower part of the lowest deposit was more than half chloride of sodium, while the upper deposit contained but two-thirds of one per cent of chloride of sodium. The question that presents itself is: Can solutions of salts separate from each other after being mixed? In continuing this subject, I shall confine myself to a phase closely connected with the foregoing experiment. The experiments tabulated herein were made more than a year ago. If I had written this paper before passing to other experiments, doubtless I should have permitted myself to theorize more freely regarding the phenomenon than I care to do at present. As it is, I shall present the experiments, and endeavor to reserve my opinions concerning them for a future day.

It may strike some persons that the present paper is entirely irrelevant to the subject of percolation and precipitation; but if I am permitted to complete this subject, I think that it will be shown that it is intimately connected with certain features that have considerably troubled pharmacists and others.

An unanswered query, once accepted by one of our most prominent members, is directly interested, and the phenomenon presented herein must be considered before that query can be satisfactorily answered. A process of percolation, suggested once, in which the menstruum was directed to be admitted at the bottom of the percolator, and permitted to escape at the top, is also concerned.

Perhaps the analytical chemist will find some food for consideration, as it does not seem unreasonable to suppose that the principle involved in this paper may be of practical value in the separation of certain bodies one from another. Then, too, it may be found advisable to forego the process of filtration, if possible, where accurate results are desired. However, after I have introduced the line of experiments, and the details into which I have been drawn, these features will readily present themselves to those interested.

Let us now revert to the separation of the two salts by the evaporation of the water. The explanation that naturally presents itself is, that their separation resulted from the fact that the chloride of sodium crystallized, and left a mother liquor of chloride of ammonium. This afterward evaporated; and thus the salts were deposited in different locations. In order to test the correctness of the view, I was led to several series of experiments; and a section of one of these may be illustrated as follows:*

Take an ordinary porous blotting-paper, and drop into its centre, drop after drop, some writing fluid. The spot will spread, but it will not present the same appearance from the centre outward. There is usually a dark centre, and then a dark line of demarcation, after which another shade appears, which, after spreading to a certain distance, will perhaps suddenly give place to a nearly colorless liquid. Continue to add the fluid slowly to the centre of the blot, and the shades of color will expand and preserve their individuality, but the outer will usually grow more rapidly than the one immediately within. Sometimes several shades will be formed, but their individual characteristics will be maintained. If the ink be one of the purple or other colors of aniline, or a carmine, it will be generally found that the outer liquid will be colorless. The striking feature is the abrupt change from one shade to the other. It is not a gradual grading off, for a distinct line of demarcation usually separates each shade. I have introduced this experiment because it can be so readily performed, and because, upon second thought, every person must even now admit its familiarity. Mix two colors of ink, say red and blue, and try the experiment again. Very likely it will be observed that, under the same conditions, one color will leave the other after both have passed together for a certain distance, and leave it completely, and by a distinct line of demarcation. Then perhaps this second color will cease to spread, and a colorless liquid will pass out, and form a ring encircling the ink spot.

These experiments may be easily made, and will illustrate the phenomenon; but since there are so many kinds of ink, it is impossible to predict a certain result. Therefore, to enter into the subject more systematically, I will bring forward the following experiment, in order to illustrate a natural phenomenon that I have not been able to find recorded in any work, and upon which those I have consulted can furnish us no information:

Dilute one part, by measure, of officinal solution of tersulphate of iron with thirty-two parts of water; then place a strip of blotting-paper, of loose texture, so that the lower end is immersed in the liquid. A liquid is absorbed, and passes rapidly into the paper, reaching to a height of about half an inch at once. Then it ceases to extend upward as solution of tersulphate of iron, but not as a liquid.† A line of demarcation appears as distinct as though drawn by a pencil, and above this line a colorless solution passes; and this liquid is absolutely free from any salt of iron. If a piece

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* (Paper read at the Meeting of the American Pharm. Assoc. at Milwaukee, Aug., 1884.)

Query.—"Is there any method whereby a solvent can be perfectly freed from a substance in solution, without evaporating the liquid, precipitating the dissolved matter in an insoluble form, or changing the liquid (as adding alcohol to water).

This question was addressed to several of our foremost scientists, and without any information being furnished as to another known method. In connection with this subject, it is proper to state that for many years it has been known that charcoal will separate certain organic matters from solution; and, according to the experiments of Mr. Witt (1856), it was shown that twenty-two per cent of chloride of sodium was taken from a solution of that substance by filtration through one and three-quarters feet of sand. [Upon this fact also depends, no doubt, at least in part, the purification of brackish or salt water when it passes through a lengthy deposit of sand or through fissures in rocks.] These facts are related to the experiments which follow, and to which we can find none similar on record. Indeed, quotations from our acknowledged authorities show that the phenomenon herein brought forward has been generally overlooked. We will cite as follows:

FILTRATION.—"The mechanical separation of a liquid from the undissolved particles floating in it."—*Ure.*

"The separation of suspended matter is effected on the small scale for laboratory purposes by filtration through porous paper."—*Roscoe and Schorlemmer.*

"The mechanical separation of fluid from solid matters mixed with them. The pores of the paper permit the fluid to pass through; whilst the solid matter, being prevented, remains behind."—*Galloway.*

* I only give enough of the series to demonstrate the one feature to which this paper is devoted. My investigations have extended far beyond the line drawn by this report, but I do not care to impose upon the society by introducing another step, as it would double the length of the paper.

† The texture of the paper influences the height to which the solution passes before the separation. The line of separation is soonest formed when the paper is porous. Very firm, compact paper will carry the entire solution to a considerable height. Common Swedish filter paper will answer, but not so well as blotting-paper.

of ferrocyanide of potassium be drawn over this paper, it refuses to strike a blue color until the dividing line is struck. Other reagents demonstrate conclusively the absence of even traces of iron above this line. Here we have presented a reaction in which a substance in solution has separated from the solvent, without evaporation of the liquid, apparent precipitation of the solid in insoluble form or change in solvent power of the liquid.

In considering this question from the experiment presented, a doubt must arise in our minds regarding the subject. Is it really a separation of a soluble iron salt from a solvent capable of dissolving it? This query naturally occurs when we notice that the upper edge of the iron solution, as it is absorbed by the paper, has a red color, which deepens as it passes upward, until finally the colorless liquid shoots above it. May it not be that an insoluble basic salt of iron is formed by oxidation of the iron, in the very thin layer of liquid? I thus questioned the matter, and found that the line of division formed as readily and the same in an atmosphere of carbonic acid gas. Again, a piece of paper from just beneath the line—indeed, the very edge of the line of division—when dipped into water, formed a solution that gave a deep blue color with solution of ferrocyanide of potassium.

This experiment, then, seemed to show that by means of an agency heretofore unrecognized in this manner, and which seems to be capillary attraction, a separation of solvent from substance dissolved can be effected, and absolutely. In analyzing the phenomenon, we find that there is not a gradual shading off of iron salt from below upward. It might seem natural to view the reaction as an absorption of the iron by the fibres of the paper through which the liquid passed, until finally all the iron disappeared. Upon the contrary, it seems to be a struggling upward of several liquids;* and when the so-called solution reaches a certain height, one part of it is attracted onward with greater force, and frees itself from the others. There appears to be an unequal attractive force between the fibres of the paper and the substances passing through them; there seems to be an unequal and independent capillary attraction between the fibres not moistened and the liquids in contact with them. These forces acting at the same time, cause a separation of solutions at a certain distance from the surface of the liquid; and after this separation is once effected, the liquid that has freed itself from the other, or others, seems to pass freely through it, or them, apparently drawn from above more rapidly than the other, or others, can follow. Thus, although the lower part of the paper is saturated with mixed solutions,† the liquid that has separated itself seems to flow rapidly through the lower stratum and out of the line of demarcation, without a molecule of the iron salt accompanying it.‡

In continuing the study of this phenomenon, we find that the proportion the iron salt bears to the liquid, influences the point at which the separation of the iron solution occurs. If the solution is dilute, the separation takes place just above the surface of the liquid in the vessel. As it increases in strength, the iron passes higher upon the paper, and with officinal syrupy solution of tersulphate of iron there will be no separation.

This fact leads to another point in connection with the subject, to wit: an attraction seemingly exists between the iron salt and the water, which is stronger in proportion to its concentration. Therefore, as the proportion is in favor of the iron, the water has less power to free itself and climb away.

Can it be, then, that capillary or surface attraction has the power to dissociate a solution? If so, it seems to us that this fact must have been overlooked in many instances where its consideration was a necessity to accuracy in results.

In looking at the phenomenon as presented in the foregoing portion of my paper, it will be seen that we may sum the matter up as follows:

1st. The bibulous paper absorbs and carries to a certain height the liquid about as it exists in the vessel.

2d. At a point above the surface of the liquid, determined by the texture of the paper and the concentration of the solution, the iron salt ceases to pass upward* as rapidly as the water or other substances held in solution by the water.

3d. Then the liquids separate, and the colorless liquid is actually drawn (or thrust) through the solution of iron without carrying a trace of ferric sulphate beyond the line of division.

In order to determine the amount of water thus passing through a liquid, I call attention to the following experiment:

A piece of blotting paper was placed with the lower end in a solution of ferric sulphate, made by mixing 1 part of officinal solution of tersulphate of iron with 32 parts of water. The separation occurred as previously described, and when the watery liquid reached the top of the paper (5 inches), the iron solution had ascended but 2 inches. The paper was then divided at the line of separation and at the surface of the liquid, the iron solution in the lower part was weighed with the paper, and the water and paper in the upper portion weighed. Each part was then dried, and weighed again.

RESULT.—Water in the part of the paper that contained iron, 7 grains.

Water in the paper above the line to which the iron had ascended, 7½ grains.

In the same way, one part of solution of tersulphate of iron (ferric sulphate) was mixed with sixty-four parts of water, and the portions of paper examined.

RESULT.—Water in the part of the paper that contained iron, 4 grains.

Water above the line to which the iron ascended, 9½ grains.

Thus it will be seen that, in the first experiment, the water that had separated was slightly greater than that remaining with the iron, while, in the second experiment, more than twice as much water escaped as remained with the iron.

I present also an experiment with acetate of lead, as follows:

Five grains of acetate of lead were dissolved in one fluid ounce of water. The paper was immersed, and the dividing line ascertained by means of a crystal of iodide of potassium. Upon separating the paper, it was found that

The water in the part of paper that contained lead amounted to 8½ grains.

Water in the paper above the line to which the lead ascended amounted to 4½ grains.

In the same way, five grains of acetate of lead were dissolved in four fluid ounces of water.

The water in the part of the paper that contained lead amounted to 5½ grains.

Water in the paper above the line to which the lead ascended amounted to 13½ grains.

All of these experiments uphold the principle that the weaker the solution the quicker the separation, and the larger the amount of the escaped water.

I have mentioned the fact that mixed colored inks separate from each other under the influence of the capillary attraction of bibulous paper. It is demonstrated that certain salts will also do this, and completely. In order to show that they act independently of each other when dissolved in a single solvent, I call attention to the following experiment:

Dissolve five grains of ferrous sulphate in an ounce of water and add one drop of sulphuric acid (to prevent oxidation).

Dissolve five grains of cupric sulphate in an ounce of water.

Mix thirty minims of officinal solution of tersulphate of iron (ferric sulphate) with an ounce of water.

Place a strip of bibulous paper upright in each, and it will be found that, at a certain height, each metallic solution is retarded. This can be readily shown by drawing a piece of red or yellow prussiate of potash down the paper, for the characteristic coloration will appear as soon as the reagent comes in contact with the salt. However, it will be found that they separate at different heights in the papers.

Now mix the solutions, and repeat the paper experiment. When the reagents are applied to the paper, it will be shown that the ferric sulphate extends only a certain distance; then a mixture of ferrous sulphate and cupric sulphate, then the ferrous sulphate alone, and finally a colorless solution passes onward perfectly free from either salt. The boundary line between each salt is clear and sharp.

Upon diluting this mixture with its bulk of water, the rule of the diluted ferric sulphate is found to be maintained, and by repeated dilution of each succeeding solution with its bulk of water, a series of regular demarcations are obtained.

In the same manner, solutions of certain alkaloidal salts can be separated from each other, as, for example, sulphate of quinine and sulphate of berberine, the quinine salt passing onward and leaving the berberine.*

In carrying this series of experiments further, it is readily shown that not only can we separate liquids from each other within the paper, but we can separate them as liquids by acknowledging the fact that a liquid tends to flow from a tube, capillary or otherwise, if the extremity is beneath the surface of the liquid in the container. Two test-tubes were placed beside each other, and into one an inch of solution of ferric sulphate (the strength before named) was poured. A strip of blotting-paper was then so placed that one end reached into the liquid, while the other end rested below it in the other vial. The paper was curved, so that the height was four inches; therefore the liquid traversed eight inches. The exposed part of the paper was covered by means of a sheet of rubber, in order to retard evaporation.

In twenty hours a layer of colorless liquid was carried into the empty vial; and this liquid refused to show a trace of iron by the usual reagents.

* Solution of tersulphate of iron contains other substances besides the salt of iron. There are free acids, and they are not retained in accordance with the detention of the iron. The indications are also that the coloration of solution of ferric sulphate is due to accompanying oxide or oxysulphate in soluble form, and that true ferric sulphate has no red color.

† I admit that the term solutions is not in accordance with our present understanding of a solutionof several salts in one menstruum. Authorities do not, we think, view them as distinct liquids mixed together and existing independently of each other, but rather as one solution. For the sake of illustrating these experiments, I shall speak of a solution of different bodies as being an association of separate solutions, each retaining its individuality.

‡ There is a gradual and uniform upward motion of all the liquids, however, although the lowest stratum in the paper moves slowest.

* I use the term upward to correspond with this line of experiments. The same phenomenon is presented when the paper is horizontal or inclined, if capillary attraction only carries the liquid outward.

* It is not unreasonable to suppose that advantage may be taken of this principle to separate certain bodies that seem to dissolve and precipitate alike. Indeed, I have used it in separating uncrystallizble coloring matters from crystals of organic bodies, where simply the close wrapping of two or three layers of blotting paper over the moist magma will remove the coloring material as the mass dries out.

Therefore, to sum up from the view presented by these experiments:

The solvent can be perfectly separated from dissolved matter by what appears to be simply capillary attraction.

We must not, however, infer that this is evidence that such a rule will be carried out with other bodies. Experiments with many salts and other substances agreed, but some refused to separate; chloride of sodium being carried to a height of six feet.

I do not design in this paper to enter into a theoretical argument regarding the causes for the phenomenon herein presented. I aim simply to present the facts, and in doing so must consider briefly certain objections that have occurred to me regarding the idea that real solutions can be separated from each other by means of the capillary or surface attraction of materials that have no recognized chemical affinity for either of the constituents. Therefore, as the substances that I have named are all solids, it might perhaps be inferred that the molecules of these solids are held in the minute interstices of the paper, while the more mobile fluid escapes.* Such a view could scarcely be sustained, because mixtures of *liquids* may be separated from each other—indeed, even though such a mixture is supposed to have combined chemically. Sulphuric acid and water are accepted as having rather an intense affinity, and their union is broken only by a considerable display of energy. The mixture of sulphuric acid and water is as perfectly disintegrated by the bibulous paper as were the other substances named by me. This can be shown by making a dilute solution of sulphuric acid in water, and allowing it to pass up the paper, and then pressing a piece of blue litmus paper upon the surface of the part of the bibulous paper that is moistened. The litmus will change to red for a certain distance, defined by a line of demarcation as distinct as that shown by the iron salt.

The facts, then, to be presented in this paper are that:

1st. Liquids can be separated from solids held in solution, without evaporating the liquid or precipitating the solid in an insoluble condition.

2d. Liquids can be separated from each other.

3d. Chemical combinations even can be broken without calling upon such recognized dissociating powers as high or low temperature, or the action of reagents.

This dissociating force has been overlooked in many places where perhaps it might have been useful. It may have been an unknown factor in leading to discrepancies in delicate analytical work that involved frequent filtration. There are other points of interest that I hope to consider in the future.

Manganese in Wines.

In three wines of lower Beaugalais (Vintage of 1865, 1882, and 1883), Maumené found considerable proportions of manganese. It appeared to exist in the wine as double tartrate of potassium and manganese. The proportion of metallic manganese in the wine of 1865 (red), was found to be 5 to 7 Mgs. per litre, corresponding to 51.73 Mgs. of double tartrate. The soil upon which the grapes grow is known to contain much manganese. Further investigation is proposed.—*Bul. Soc. Chim.—J. Am. Chem. Soc.*

Boldo has been found by Chapoleaux to contain a glucoside soluble in alcohol and benzin and insoluble in water which acts as a hypnotic and, when subcutaneously administered, increases the flow of bile.

* It must be admitted that such a view is not in accordance with our idea of a solution.

[Original Communication.]

THE SULPHATES OF BERBERINE.

BY PROF. J. U. LLOYD.

In 1878, a paper on the salts of berberine, as obtained from *Hydrastis canadensis* L., was presented at the meeting of the American Pharmaceutical Association. The writer announced that, when sulphate of berberine is added to ammonia water, by double decomposition, a dark solution of berberine results, which by mixing with alcohol is mostly purified from the sulphate of ammonium which precipitates. Filtration now separates the solution of berberine, and the addition of ether to the filtrate then precipitates the berberine as a lemon-yellow crystalline powder. It is unnecessary to go over the properties of this substance in the present paper, as my object is to call attention to the fact that the substance obtained is not berberine, *but a soluble sulphate of berberine.* The writer has been aware of this fact for some years, but out of deference to an investigator who intended to consider the subject, waited for his report. However, this gentleman, Dr. T. L. A. Greve,* of Cincinnati, having withdrawn from the field, I feel at liberty to make the foregoing statement, and in addition briefly announce the following.

There are two sulphates of berberine and they bear a resemblance to the two sulphates of quinine, excepting that in solubilities they are the reverse of the quinine salts. Thus:—

$(C_{20}H_{24}N_2O_2)_2H_2SO_4.7H_2O$.—Sulphate of quinine, *less* soluble than the bisulphate $C_{20}H_{24}N_2O_2H_2SO_4.7H_2O$.

$(C_{20}H_{17}NO_4)_2H_2SO_4$ sulphate of berberine *more* soluble than the bisulphate $C_{20}H_{17}NO_4H_2SO_4$.

The existence of these two sulphates was announced in New Remedies, 1877, p. 226, in a paper by Mr. H. B. Parsons and Mr. T. J. Wrampelmeier, but they simply made the analysis without giving a description of the salts. Since that day, nothing has been printed to support or disprove of their work, and I take pleasure, therefore, in saying that beyond a doubt the two sulphates exist. My own investigations show that such is the case, as well as the analysis of Prof. Virgil Coblentz, who, unaware of the work of Messrs. Parsons and Wrampelmeier, made several determinations of each salt as made by us. His report agrees exactly with that of the other gentlemen.

To sum up:

The original sulphate of berberine, $C_{20}H_{17}NO_4H_2SO_4$, that of the market, is a *bisulphate* and only moderately soluble.

The new sulphate of berberine $(C_{20}H_{17}NO_4)_2H_2SO_4$ is very soluble.

It may not be improper to state that the paper presented to the American Pharmaceutical Association and alluded to in this, was by the writer.

* Dr. Greve accepted a query on the subject at the Indianapolis meeting of the A. P. A., and continued it until last year. He then notified the chairman that circumstances prevented him from attending to the matter, and he was accordingly released.

A SPECIFIC GRAVITY BURETTE.

James J. Dobbie and John B. Hutcheson, preparators to the chair of chemistry at the University of Glasgow, have devised a very handy apparatus for accurately determining the specific gravity of solid substances, and which they call "Specific Gravity Burette."

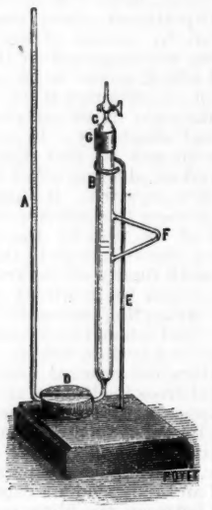
The apparatus consists of a U tube, one of the branches (*A*) of which has a diameter of about 3 millimeters (⅛ inch), while the other (*B*) limb is of wider calibre. A short piece of tube, *C*, of the same diameter as *B*, provided with a glass faucet, is connected with *B*, by means of a rubber-joint, so that it may be easily taken off or replaced.

The apparatus is kept upright by a stout wire *E* and a piece of wood with a notch in which the curve of the U tube rests. Tube *A* is graduated in cubic centimeters and on a level with the bottom mark on this tube, some lines are placed upon the tube *B*, which serve as guide-marks.

The apparatus is used in the following manner. At first the tube is filled with a suitable liquid until this reaches to the bottom mark of graduation in tube *A*. Then, having weighed the substance the specific gravity of which is to be determined, this is introduced into the tube *B*, from which the faucet attachment has previously been removed. The level of the liquid will then rise in both branches. [Of course, the substance must have been brought to such a condition that it cannot retain any air; and the liquid must exert no solvent action upon it.—Ed. A. D.]

The faucet piece *C* is then connected and the faucet having been opened, air is blown in until the liquid in *B* has been depressed below the guide-marks. The faucet is then closed and carefully reopened to let enough air escape until the level of the liquid is at the mark where it was previous to the introduction of the substance.

It is now only necessary to read off the volume displaced by the body, in



Specific gravity burette.

cubic centimeters. The specific gravity is found by dividing the weight in grammes by the volume of displaced liquid in cubic centimeters, *no matter what liquid may have been employed in the experiment.*

In order to facilitate the liquid being brought to the same level again in *B*, Mr. Gray, of Glasgow, has suggested to the authors to connect with the tube a smaller, lateral one, in the form of a > (*F*), which is graduated. The level then can be very accurately adjusted.

The determinations made with this apparatus have been highly exact and concordant.—*Philos. Magaz.* and *La Nature.*

To Prevent Labels on Glass Vessels from Moulding or Peeling off.

Labels affixed to glass (or other) vessels, when exposed to dampness for some time, have a tendency to become stained with spots of mouldiness which is due to a development of fungi on the gummed surface. This may be prevented by adding to the paste a small quantity of borax, about 1 drachm to the quart.

To prevent labels attached to glass from peeling off, it is recommended to use a paste consisting of 2 volumes of flour paste and 1 volume of liquid glue.

Chinese settlers in Mercedes County, California, are reported to be cultivating the opium poppy successfully.

THE ART OF DISPENSING PILLS.*

THE characteristics of well-prepared pills are that they are not too soft, do not stick together nor flatten, that they are smooth and round, all of the same size, and all contain similar proportions of medicinal ingredients.

The preparation of good pills often requires much practical judgment and experience. It is not to be expected that the prescriber should be able so exactly to balance the ingredients that a perfect pill-mass should result, especially as the extracts themselves are likely to vary in consistence. Much better is it that the means of forming the compound into a good mass should be left to the judgment of the dispenser.

[We omit Dr. Hager's descriptions of mortars, spatulas, pill-machines, and the process of making pills.]

Rounding pills with the fingers is only permissible when the mass is of such a character that it crumbles under the rounder. The rounder consists of two pieces made of hard wood, with a handle and a rim of such depth that the pill can be lightly pressed. The rolling-surfaces should not be polished. Several sizes of these rollers should be kept for differently-sized pills. The cut pills are laid on the tray, sprinkled with a little powder, and, being covered by the roller, they are rapidly, and with slight pressure, revolved.

Powder is used to prevent pills sticking to each other, and, to some extent, to conceal their taste. Where no particular powder is ordered, lycopodium should always be employed. Cinnamon, licorice, fennel, orris, starch, etc., are also used. A mixture of 1 part of vanilla with 9 parts of sugar of milk makes a good powder for pills. Ordinary sugar should not be used, as it makes the pills damp.

A pill-sieve is sometimes employed to remove excess of powder.

Pills with hygroscopic, strong-smelling or volatile ingredients should be always dispensed in bottles.

To make pills that will keep their shape for a reasonable time, they ought to contain some fibrous vegetable powder in their composition. Where such is not ordered, the dispenser has often to use it, but, of course, what he uses must be both medicinally and chemically inert.

EXCIPIENTS.

Powdered gum arabic by itself is an excipient of very little value for the purpose of giving consistence; but, with the addition of 10 per cent of pulv. althææ, it becomes a good excipient, helping to form a mass of good consistence, and which binds well.

Pulv. althææ, if used largely, has a tendency, in consequence of its large proportion of mucilage, to prevent the solubility of the pills, and to reduce their activity. Besides, it is apt to make the mass too elastic to work well into a shape, and to harden too much afterwards. Not more than 1 grain to 5 or 10 grains should be used. Three pounds of marshmallow powder require 2 parts of water to form a mass. In large dispensing business the following powders are sometimes kept ready for pills that require a binding excipient:

For White Pills.

Pulv. althææ	10
Farinæ secalinæ	10
Sacch. alb	10
Pulv. iridis	70

M. ft. pulv. subtil.

For Colored Pills.

Pulv. althææ	15
Farinæ secalinæ	10
Sacch. alb	10
Pulv. iridis	50
Pulv. gentian	15

M. ft. pulv. subtil.

Argilla (china-clay) is useful in cases where a vegetable addition might lead to decomposition or oxidation, as, for example, with nitrate of silver, chloride of gold, chromate, bichromate, permanganate, or chlorate of potassium, etc. The white washed variety freed from sand and chalk given a good pill-mass with water; 10 grammes require 3.6 of water.

Powdered white beans are useful, both as regards consistence and binding. For 3 parts, 2 parts of water are necessary.

Powdered orris does not bind, but is useful for giving consistence.

Powdered licorice contains but little mucilage, and therefore is not very binding, but it is a suitable adjunct if licorice is ordered in the pills or to be sprinkled over them.

Sugar without some mucilaginous addition is not good. Syrup, however, with pulv. althææ is very useful.

Starch sugar is often a very serviceable excipient, though it is not generally at hand in convenient powdered form.

Powdered tragacanth is especially to be recommended when the mass is too soft, and when it is desired not too much to increase the weight. If masses crumble, a little tragacanth powder, with a few drops of glycerin, will bind them.

Some years since a glyceride of tragacanth was recommended as a vehicle for pills. It was prepared from 3 parts of tragacanth, 9 parts of glycerin, and 4 parts of water. But it has not proved satisfactory, and pulv. althææ is generally preferred.

Salep is also sometimes used for soft masses when a very slight increase of weight is essential. It is always combined with some pulv. althææ.

Pills with mucilaginous constituents only require watery fluids to make them into masses. Spirit causes them to crumble. Equal parts of glycerin and water are often preferred to pure water to add to pill-masses, on account of the greater plasticity obtained, but the hygroscopic property of the glycerin is an objection.

[For the benefit of younger dispensers a practical summary of the valuable information contained in the foregoing paragraphs may be useful. The main purpose of an excipient is to impart tenacity to the mass, and consequently the one chosen will be moist or dry according to the nature of the other ingredients. 1st. Moist excipients commonly consist of one or occasionally a combination of the following substances—alcohol, extracts (soft), confection of hips or roses, glycerin, honey, mucilage of acacia and tragacanth, soap, syrups, treacle, water, oils. 2d. Dry excipients commonly consist of one or a combination of the following substances — bread crumb, manna, powder of gum acacia and tragacanth, althæa, flour, licorice, orris, starch, sugar, and occasionally, where highly oxidizing chemicals are ordered, an inorganic compound as kaolin. Some of these excipients, such as alcohol and water among the moist excipients, and gum acacia and tragacanth among the dry, occasionally leave the pills very dry and hard, and therefore are not suitable unless combined with some more softening ingredient, such as glycerin, treacle, soap, etc. Other excipients, on the other hand, such as glycerin or treacle, are too hygroscopic, and therefore require to be restrained by some counteracting influence, such as water or one of the gums. A variety of excipients, such as bread crumb, althæa, and tragacanth render the mass elastic and spongy, while others, such as orris, licorice, sugar, etc., do not bind. In short, an intimate acquaintance with the proportion of the various ingredients is in every case necessary, and distinguishes between a pharmacist who has studied his profession and one who merely follows it by rule of thumb.]

[Where fluids require to be added to form a pill mass, it will be always found risky to add them direct to the mass, and as a Salleron's Dropper may not be available, a good plan is to drop the fluid first on to the point of the spatula, and from it to the mortar in quantity necessary to form a mass.]

Pill-masses containing dry vegetable powders require some few minutes to absorb the added water, and, therefore, should be made a little too soft, and allowed to stand for ten to fifteen minutes before rolling, or they are liable to crumble.

If the physician orders a powder with an extract q. s., the dispenser adds the latter little by little; but he is not a neat dispenser if he use the same spatula for scraping the mass from the pestle and to dip into the extract-pot.

If a definite quantity of extract be ordered, the dispenser may find it exactly sufficient to make a mass. If it would make the mass too soft, however, he must, if the extract be an active one, either use it in a drier state or add some inert powder to it. If the extract, however, be of no particular activity, some powder of the same plant may be substituted for a portion of it, as, for instance, if 20 grains of extract of gentian were ordered, he might use 10 grains of extract with 10 grains of powdered gentian.

[The objection to this plan is the variation which it is apt to cause in the size of the pill, 10 grains of extract and 10 grains of the crude powder frequently producing an objectionable increase in the bulk of the pill. The better plan, we think, in such cases is to diminish rather than increase the bulk of the pill, and, therefore, where an extract is too soft, we recommend that it be evaporated to a proper consistence, and for this reason every pharmacist should have some simple and ready appliance for accomplishing this without risk to the extract.]

Sulphate of quinine with extract of gentian makes a mass which, though sufficiently plastic when first used, crumbles when rolled out. The addition of a few drops of acid (10 drops of acid. sulph. dil., or five drops acid hydrochlor., to 15 grains of quinine), with some marshmallow powder, will give the necessary permanent plasticity.

[If the extract of gentian be soft enough, or rendered soft by the addition of water, previous to the quinine being added, no difficulty will be experienced in rolling out the mass. In connection with the suggested addition of an acid, it should not be forgotten that quinine makes a beautiful mass with the addition merely of tartaric acid and water. The following proportions will be found to make a good mass: Quinine sulphate, 30 parts; tartaric acid, 5 parts; water, 1 part. Where a pure white pill such as this is produced, no better dust for rolling them in will be found than fine sifted arrow root.]

Soap powder makes the best pill mass, with vegetable powders, extracts, and gum resins. Soap being decomposed by acid salts, acids, and tannin substances, it is not suitable for masses containing these. In using soap, care must be taken not to add too much water. Soap masses at first appear dry and crumbly, so that the dispenser is tempted to add more water, and then finds afterwards that he has too soft a mass. A few drops of spirits of wine has this effect to a still greater extent, so that it must be used very carefully.

RESINOUS INGREDIENTS IN PILLS.

Gum resins and resins must be first rubbed to a fine powder, and, to pre-

* Abstract from Dr. Hager's work on Pharmaceutical Manipulations. Taken from The Chemist and Druggist of July 15th. The portions in brackets are by the editor of that journal.

vent them from sticking to the mortar, the latter and the pestle may be first rubbed with paper soaked in almond oil. The resinous powder is easily made into a mass with a few drops of spirit, but the pills so made do not keep their shape. To most of such substances, to aloës especially, the addition of a little vegetable powder—marshmallow powder, for example—is desirable. Asafetida gives pills of good consistence, with a few drops of weak spirit; but such an addition with aloës produces pills which flatten. Spirit should be added very cautiously, as it is often found, especially when any soap is present, that, on working, the mass becomes softer than it appeared at first.

[In many cases such, for example, as when it is not advisable to add to the bulk of the mass, spirit is undoubtedly the best medium for converting gum resins and resins into a mass, and, if care be taken, no better need be desired. The main thing to be observed is, not to add too much spirit. The mass, for example, should never be made so soft as those made with ordinary excipients, but should, on the contrary, be so hard as to roll only with some degree of pressure. If this be attended to, they will not fall. Where, however, the pills require to be kept for a length of time, some less drying excipient should be used. In all cases where pills are composed mainly of resins, too much friction with the rounder in finishing them should be avoided. We have had occasion frequently to observe the peculiar effect which smart friction (probably from the heat enveloped) produces on various resinous substances in the way of changing their physical properties, and in many cases the principal cause of pills falling to our knowledge is due as much to the friction used in rounding them with the finisher as to the excipient used.]

For gum resins diluted spirit, and for pure resins 90 per cent spirit should be used. About 5 or 6 drops to 10 grammes is generally sufficient in the latter case. If the resinous mass is crumbly, it is easily worked up with spirit, or with the smallest possible addition of soap powder, but the latter only if metal and earthy salts are absent.

Examples:	Grammes
Extracti rhei compositi..	4.0
Saponis jalapini.....	4.0

M. f. c. spiritus vini guttis nonnullis massa pil. Ex qua form. pil. No. 60.

This combination would yield a pill mass out of which it would certainly be possible to form pills, but these would soon either flatten or run together. An addition of 1.5 gramme of marshmallow powder obviates this difficulty.

	Grammes
Extracti rhei	5.0
Gummi ammoniaci.....	10.0
Aloës pulveratæ.....	7.5
Tincturæ myrrhæ	9.8

Ut f. pilulæ 200.

Instead of the tincture of myrrh, which is prepared with 90 per cent spirit, half water and diluted spirit, for each 30 drops, should be used, and this, with the addition of 2 to 2.5 grammes of marshmallow-root powder, gives a plastic pill mass.

In summer it is often found impossible to rub gum resins to a fine powder. In such cases, they should be worked into a mass, after gentle warming in a water bath.

BALSAMS, ETC., IN PILLS.

Pill masses are sometimes required with fluid or soft resins, fluid balsams, oils, or fats, as ingredients. When the quantity of these is too large to admit of the formation of a mass by the addition of any reasonable quantity of powder, recourse must be had to wax. Balsam of copaiba, balsam of Peru, extractum filicis, extract of cubebs, creasote, carbolic acid, ethereal oils, and other substances, melted with gentle heat, with one-third to an equal weight of wax, yield very good pill masses, but the mixture must be quite cold before combination with any other ingredients. The addition of ether or spirit destroys the plasticity of this compound. The wax, with the balsam, etc., must be melted very slowly, as the application of a strong heat would be likely to injure the medicinal properties of the ingredients. It is preferably performed in a porcelain pan, as the thick substance of a pill mortar would require a greater heat and would, besides, cool more slowly. Yellow wax only should be used. The wax should be first gently melted, then an equal weight of balsam added, and subsequently the rest of the balsam, before the mixture has set. Combination of the balsam with calcined magnesia, gum arabic, or yellow resin is not permissible, unless expressly directed by the prescriber; but even when such are ordered, it is generally desirable to add some wax, as even a very little considerably facilitates the preparation of the mass.

Example:	Grammes
Bals. copaivæ.....	25.0
Cubebar. pulv.....	q. s.

M. Ut fiant pilulæ No. 500.

Yellow wax 12.5 grammes are melted with 10 grammes of the balsam and, before cooling, the remaining 15 grammes are added. When perfectly cool, the mass is worked with about 60 grammes of cubeb powder.

	Grammes
Balsami copaivæ.....	30.0
Cubebarum.....	30.0

M. F. l. a. pilulæ ponderis 0.15.

Pills made from this formula would require an addition of wax, which would necessitate pills of twice the weight indicated. But by taking 25 grammes of balsam and melting with 25 grammes of wax, and then combining with 40 grammes of cubebs, a mass is made which can be divided into 400 pills of 0.2 weight. Such a variation should be carefully marked on the prescription.

In pharmacies where copaiva pills are frequently required, a mixture of 2 parts of balsam of copaiva and 1 part of wax is kept ready; 3 parts of this mixture require 5 parts of cubebs to form a pill mass.

Balsam of copaiva is thickened by calcined magnesia, a sort of soapy combination being formed; but this condition is only acquired slowly, so that twenty-four to forty-eight hours are necessary before pills can be formed. A gentle heat and a few drops of water hasten the thickening. If *Balsam. copaivæ magnesia solidificatum* is not ready prepared, it is made by mixing 10 grammes of the balsam with 6 grammes of the magnesia and 30 drops of water. The mass is put in a porcelain ointment-jar, which is set for an hour in a warm place (about 50° C.), and afterwards removed to a cool place. Generally, good pills can be made from this mixture with some organic powder in twenty-four to thirty-six hours. But it is better to keep the compound ready, and it keeps well in securely covered porcelain vessels. To make the mixture for stock 100 grammes of balsam, 45 grammes of calcined magnesia, and 5 grammes of water are mixed, warmed for an hour, as before, and, after well stirring, set aside for ten days, in which time they make good pills with less than an equal quantity of cubeb powder.

The following substances, with 1 to 2 parts of melted wax and 4 to 5 parts of dry organic powder, yield, after cooling, good pill masses:

Acid. carbolic.	Ol. crotonis
Apiolum	Ol. empyreumat. e ligno fossili
Camphora	Ol. lithanthracis
Coninum	Ol. myristicæ æth.
Extr. cinæ	Ol. myrrhæ
Extr. filicis	Ol. nucistæ
Kreasotum	Ol. picis liquidæ
Leucoleinum	Propylaminum. s.
Nicotinum	Trimethylaminum
Pix navalis	
Pix lithanthracis	
Ol. animale fetidum	

Balsam of tolu cannot be melted with wax, but it can be worked up into a mass with another wax compound, after cooling.

[In all the foregoing instances, and also in some afterwards mentioned, it is to be remarked that the wax is now very much discredited, owing to its insolubility in the stomach. Cacao butter will be found in most instances a much better medium, having a lower melting-point.]

If with a wax compound some vegetable powder containing moisture has to be added, the latter may make the pills crumbly. It is best first to dry the powder, or to take up the moisture by means of tragacanth.

Ethereal oils in small quantities do not much interfere with the formation of pill masses; but when the quantity to be compounded is considerable, they should be melted with wax or with powdered yellow resin to a doughy mass, and then mixed with a vegetable powder. If gum resins or resins are ordered, the ethereal oils can be combined with wax by gentle warming in a test tube.

Caoutchouc pills are best made by evaporating (without any flame, of course) a benzole solution of caoutchouc to syrupy consistence, then combining with so much bole Armeniac as will make a soft mass, rolling on a warmed iron pill-machine, and rounding with the fingers. Vulcanized caoutchuc, of course, is never used.

PHOSPHORUS PILLS.

Phosphorus is best made into pills by first dissolving it in melted wax. The wax is melted in a test tube, the phosphorus, dried on a piece of blotting-paper, is dropped into it, and, by warming and stirring with a clean knitting-needle, is perfectly dissolved. The solution is mixed with an organic powder in a lukewarm pill mortar, and only made into pills when quite cold.

Example:	Grammes
Phosphori.....	0.2
Ol. amygdal.....	10.0
Ol. cacao.....	10.0
Flor. malvæ pulv.....	q. s.

M. Ft. pilulæ No. 200. Argento foliato obducendæ. D. ad vitr. S. Four or five pills twice or three times daily. —Dr. Tavignot.

Proceed as under:—

	Grammes
Phosphori	0.2
Add to	
Ceræ flavæ.....	10.0
Ol. amygdal.....	5.0
Ol. cacao.....	5.0

previously melted (together) and warm under agitation, until the phosphorus is dissolved. Then mix the liquid with fifteen grammes of any vegetable powder. After cooling, make into pills and coat them with silver-foil.

[In connection with phosphorus pills, the numerous articles and formulæ which have appeared in our columns should be consulted.]

PILLS WITH SALTS, ACIDS, ETC.

Substances which are decomposed by iron, such as sublimate, calomel, argent. nit., copper, and bismuth salts, must not be mixed in an iron mortar. Marshmallow root or tragacanth is generally the best excipient. Salts easily soluble in water naturally require very careful addition of moisture. Acetate of potash cannot be kept in pills even in glass vessels. In a very pressing case the dispenser might be

justified in using dry acetate of soda instead. It would, however, be better to inform the prescriber of the difficulty. It might be possible to keep pills fairly containing 1 part of acetate of potash with 3 parts of tragacanth and 1 part of marshmallow.

Tragacanth is generally mixed with salts and the necessary addition of water or of aqua glycerinata added.

Corrosive sublimate in pills should be first rubbed to a fine powder, and then carefully mixed with the vehicle. Sugar moistened with a third of its weight of water and then made up with dry powdered crumb of bread is a suitable vehicle. With new bread no water would be necessary. Dzondi's sublimate pills are ordered to be made with 0.75 gramme hydrarg. bichlor., with bread crumb and sugar each q.s., to make 250 pills. The salt should be most thoroughly mixed with 3 grammes of sugar; to this another 10 grammes of sugar should be added, 13 grammes of dried crumb, and 4.5 grammes of glycerinated water, to make 250 pills.

Crystallized salts, fluid acids, soft extracts, with an organic powder, often make a mass of muddy consistence, which rights itself by waiting ten to fifteen minutes. Time should always be given for an organic powder to suck up moisture.

Blaud's and Niemeyer's pills are made by combining 15 grammes each of crystallized sulphate of iron with the same quantity of carbonate of potash. After rubbing the iron salt in an iron mortar the potash salt is added, and a damp mass is formed which is set aside for fifteen or twenty minutes. It is then of a thin muddy consistence. To this is added about three-tenths of its weight of tragacanth and a few drops of glycerinated water, and the mass is set aside for another ten minutes. If it is then at all crumbly a few more drops of glycerinated water may be added, and a good mass will be formed.

[The quantity of tragacanth here ordered, as in some other instances, is much too large. A good rolling mass can be made with a smaller quantity, say one-tenth.]

Bicarbonate of soda and crystallized sulphate of iron prescribed together must be treated in a similar way, only plenty of time and occasional stirring must be given to allow of the development of all the gas.

Pills with acids must be made in porcelain mortars. With the addition of marshmallow powder and glycerinated water good plastic masses are obtained.

Examples—

	Grammes
Pepsini opt.	2.5
Rad. rhei	5.0
Extr. gentianæ	1.5
Acid. muriatici	gtt. 20

(Rad. alth., aq. glycerini, each 0.5.)
M. Ft. pilulæ 100.

	Grammes
Chinidini sulph.	5.0
Cinchonidini sulph.	5.0
Tragacanthæ.	4.0
Rad. gentianæ	8.0
Acidi muriatici.	5.0
Glycerini	7.5
Rad. althææ, q.s	(1.5)

M. Ft. pilulæ 100.

The cinchona alkaloids in pill-masses when first mixed make a soft mass, which becomes hard in twenty to thirty minutes. Muriatic acid being volatile, the pills must be dispensed in bottles.

Glacial phosphoric acid, if not in stock, must be prepared by evaporating five times the quantity over a spirit-lamp to a syrupy consistence, and making up with marshmallow or tragacanth powder. Four parts of acid of syrupy consistence require about 6 parts of marshmallow or 5 parts of tragacanth.

Blancard's iodide of iron pills were formerly prescribed to be made as follows:—Combine 4 g. iodine with 2 g. of powdered iron in 8 g. of water, filter on to 5 g. of honey, evaporate to 10 g., and make into pills with marshmallow and licorice. A shorter and equally good process is to stir 2 g. of iron with 4 g. of iodine in 4 g. of distilled water in a porcelain mortar until the brown color has disappeared. Then mix 4 g. white sugar, 3 g. marshmallow, and 7.5 g. licorice. Make 100 pills, which roll in powdered iron, and dry in a warm place. The dried pills to be varnished with balsam of tolu.

When reduced iron or powdered iron is combined with vegetable extracts containing, as most do, some acid ingredients, the addition of any moisture occasions the development of hydrogen and some oxidation of the iron, and the pills are liable to swell. In such cases the ingredients should be mixed to a soft consistence, set aside and frequently stirred.

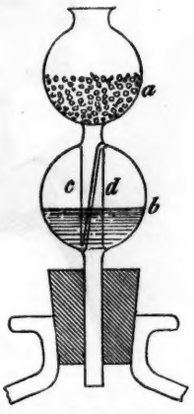
Example.—Pilulæ Aperientes Stahlii:—

	Grammes
Aloes	15.0
Extr. colocynth	7.5
Ferri pul	4.0
Mucilag. g. arab	q.s.

M. Ft. pil. 250.

Quinine pills are likely to crumble, but if an acid and a few drops of glycerin are added a good consistence is retained.

Glycerin keeps pills soft, but, being a very hygroscopic body itself, it cannot be used with other hygroscopic bodies. Glycerin ceases to show this character when it contains at least one-third of its weight of moisture, or when it is mixed with non-hygroscopic organic powders.



AIR FILTER FOR EXSICCATORS.

MANY exsiccators are so arranged that, when the cover is put on, the interior air has no chance of equalizing its pressure against that of the external air, and in some cases this is a positive disadvantage, since the sulphuric acid, or chloride of calcicm, over which some substance is to be desiccated, does not easily remove the last trace of moisture from a rarefied space. It is therefore better to have a perforated neck in the cover, and to insert into the neck some contrivance which permits the external and internal air to communicate, without, however, introducing any moisture from without.

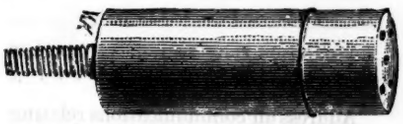
The arrangement shown in the cut and devised by Paul Julius accomplishes such a purpose.

The globe *b* is filled with sulphuric acid, and the globe *a* contains glass beads. If a hot crucible is placed under the exsiccator, the heat expands the confined air and drives some of the sulphuric acid in globe *b* into *a*. When the crucible becomes cold, the acid retreats to *b*, air enters through the tube *c*, passes through the acid and thereby becomes dry, and then enters the exsiccator.—*Zeitschr. für anal. Chem.*, 1883, 525.

The Reddening of Carbolic Acid.

THE theme of the reddening of carbolic acid has given rise to many speculations, experiments, and announcements obtained by various observers. The latest paper on the subject is by an author who signs himself G. K., in the *Pharm. Post*, and who comes to the following conclusions, one of which may be new to our readers.

Carbolic acid which acquires a tint or color always contains foreign substances, either introduced during the distillation, such as empyreumatic oils, or copper derived from the still and worm, or subsequently taken up by it. One of the impurities thus absorbed is cobalt, derived from the ordinary blue glass vessels in which is has been supposed the acid should be kept. The author again points out the uselessness of blue glass for preventing changes through the influence of light, and states correctly that *pure* carbolic acid need not fear exposure to light, and that an impure acid will change its tint even when protected by blue glass.



AIR-FILTER FOR WINE-CASKS.

A MANUFACTURER of Reims, Mr. Berthelot, has recently made a practical application of one of Mr. Pasteur's observations in connection with the keeping of wine. When a package of wine is tapped and provided with a wooden faucet, it is necessary, as every one knows, to bore a hole in the upper part of the cask to admit air. Butlers take care to stop up this aperture with a wooden spigot [or, if the wine is consumed too slowly, either draw off the whole cask in bottles, or refill it from others], for, if it is not closed, the wine turns sour, owing to the germs introduced with atmospheric air. As a substitute for the spigot, Berthelot has devised the filter-bung here shown. It consists of a hollow, metallic cylinder containing a wad of cotton and which is screwed into the bung-hole. The air, in passing through the cotton, is filtered and freed from all its dust and germs, and is thereby rendered innocuous to the wine.—*Scient. Am. Suppl.*

Hippurate of Sodium.

DR. GONROD made the observation that hippurate of sodium, when coming in contact with uric acid, caused the latter to decompose [?], and, for this reason, the salt is recommended as a remedy in such diseases which are caused by an excessive production of uric acid in the organism, as in many kidney diseases. The salt is used in form of powder or solution. Peter Boa recommends the following liquid mixtures:

	Gm.		
1. ℞ Sodii Hippuratis	5.0	75	grains
Lithii Carbonatis	1.5	24	"
Glycerini	15.0	½	fl. oz.
Aquæ Cinnam.	240.0	[ad] 8	" "

Dose: 1 fluidounce.

	Gm.		
2. ℞ Sodii Hippuratis	7.5	112	grains
Potassii Citratis	11.5	170	"
Syrupi	24.0	¾	fl. oz.
Aquæ Menthæ pip.	180.0	6	" "

Dose: A tablespoonful.

—*Arch. de Pharm.*

A German Test for Watered Milk consist in dipping a well-polished knitting-needle into a deep vessel of milk, and then immediately withdrawing it in an upright position. If the milk is pure, a drop of the fluid will hang to the needle; but the addition of even a small proportion of water will prevent the adhesion of the drop.

THE

American Druggist

(NEW REMEDIES)

AN ILLUSTRATED MONTHLY JOURNAL

OF

Pharmacy, Chemistry, and Materia Medica.

VOL. XIII., NO. 9. WHOLE NO. 123.

FRED'K A. CASTLE, M.D., - EDITOR.

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PUBLISHED BY

WM. WOOD & CO., 56 & 58 Lafayette Place, N.Y.

SEPTEMBER, 1884.

SUBSCRIPTION PRICE per year, - - - - $1.00

SINGLE COPIES, - - - - - - - - - - - 10

Address all communications relating to the business of the AMERICAN DRUGGIST, such as subscriptions, advertisements, change of Post-Office address, etc., to WILLIAM WOOD & CO., 56 and 58 Lafayette Place, New York City, to whose order all postal money orders and checks should be made payable. Communications intended for the Editor should be addressed to THE EDITOR OF AMERICAN DRUGGIST, in care of William Wood & Co., 56 and 58 Lafayette Place, New York City.

The AMERICAN DRUGGIST is issued on the 25th of each month, dated for the month ahead. Changes of advertisements should reach us before the 10th. New advertisements can occasionally be inserted after the 18th.

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EDITORIAL.

OUR esteemed contemporary, *The Druggist* takes us to task for publishing an original communication on Extract of Cannabis Indica, by Mr. Henry Maclagan, of New York (in our July number, p. 121), in which the author reports that, according to his experiments, the green color of this extract is really due to copper. In reply we would state that the above paper comes from such a respectable source, and the author's experiments have been conducted under such careful management, on behalf of one the first drug-houses of New York, that we felt it our duty, and would always feel it our duty under similar circumstances, to cheerfully give space to such a communication. We cannot be considered responsible for the assertions of new facts of our contributors, as we cannot be expected to verify these in each case ourselves; but while we unhesitatingly reject such communications as in our estimation bear the stamp of improbability or faulty deductions on their face, we feel bound to accept those which come to us from responsible hands. We have no doubt that the author of the paper is amply able to conduct his own cause, and to convince others of the correctness of his assertion, if correct, or to acknowledge his error, if mistaken.

SOME disappointment was felt by many who are interested in the welfare of the National Retail Druggists' Association that so few members attended the meeting at Milwaukee. Indeed, the opening session was delayed for want of a quorum, and at no time was the attendance as great as might reasonably be expected. Western druggists appear to have suffered as yet too little from the conditions which have led to the formation of a protective union to feel the need for it, and the distance to Milwaukee was too great to permit the attendance of many eastern members. The proceedings consisted chiefly of measures to perfect the organization, and the reelection of the officers and active committeemen of last year will doubtless do much towards hastening the enrollment of a large proportion of the retail druggists of the country before the next annual meeting.

John Ingalls,

OF MACON, GEORGIA,

President of the American Pharmaceutical Association.

THERE may be some difference of opinion about the best mode for relieving the present depression of business among retail pharmacists, and the successful plan may not yet be discovered, but there can be but one opinion about the importance of an early organization of the trade, for without it no plan of relief, however well adapted to the circumstances of the trade, can ever be enforced. Any retail druggist who expects to continue in the business is certainly very oblivious to his interests who does not at once become a member of the N. R. D. A. and do what he can to encourage discussion of and action upon the questions at issue.

THE American Pharmaceutical Association has held another of its interesting sessions, and contributed still further to the advance of pharmaceutical science. Although the cutting of prices on patents is considered to be the "burning question" of the day, it is evident that it is by no means so attractive as the discussion of the scientific topics which form the chief purpose of this body. We are unable now to give more of a report of proceedings than a list of officers and committees elected, but our readers will find elsewhere in this number some of the interesting papers which were read.

The President elected has long been identified with the Association and has done much to further its interests in the south-eastern States. He has already served as its Vice-President on more than one occasion.

SOME time since we were requested to furnish a correspondent with information about the manufacture of milk-sugar, an industry which has been attempted in some of the dairy regions of this country, but which, for some reason, had not flourished in a way that one might suppose it would where the by-product of cheese manufacture could be had for almost nothing. We then found the available literature of the subject very unsatisfactory, but have since been able to obtain from a practical Swiss chemist (Mr. J. Cunz) a very full and carefully worded paper on this subject, which we are happy in being able to offer in this number as a guide to such of our readers as may like to experiment in the manufacture of milk-sugar.

THE first issue of the new French Codex having been contaminated with a considerable number of errors, some of which were quite serious, a corrected edition has been printed and been issued. French pharmacists, who were compelled by law to procure a copy of the first edition as soon as issued, now demand of the Government that the second corrected issue should be furnished to them free of charge—a demand which seems quite reasonable, and will probably be acceded to.

THE RELATIONS BETWEEN FLOWERS AND INSECTS.

WHEN the trees in our gardens become covered with their first flowers in the early spring, and when we observe the hive and humble bees, in their feverish activity and their eagerness after loot, making havoc among them, the first sensation we experience is admiration of the grand harmony which has laid a cover for the famished insect world, roused from their lethargic sleep by the warm rays of the spring sun.

But while some may be satisfied with admiring nature, others have gone further and have tried to ascertain whether the plants have thus covered themselves with honey-bearing flowers merely for the purpose of appeasing the appetite of insects. Sprengel (in 1785) was the first to recognize the importance of the relations between the flower and the insect. That which had been timidly advanced by the German Spiritualist, was brilliantly confirmed by subsequent philosophers, and among them there are two who threw the clearest light upon the subject. We mean, of course, Darwin and Sir John Lubbock.

Profiting by the patient and scholarly labors of their predecessors, H. and F. Mueller, Delpino, Axel, Bennet, Hooker, Hildebrand, Ogle, and others, and gifted with a prodigious faculty of observation and power of drawing positive deductions, these two great naturalists did not hesitate to announce a law, as unexpected and bold as it turned out to be lucid and plain, namely, that—with the exception of certain families—most plants can be fertilized only through the agency of insects. The bee alighting upon a male flower becomes covered with pollen which it subsequently carries upon the organs of the female flower, thereby fertilizing it.

These facts showed that the plant, in its evolution, was condemned to obey the great law common to all living beings, namely that of having to struggle for its existence, or in other words, to enter the competition for life. Flowers with inconspicuous corollas or devoid of pleasant odor cannot, as a rule, sufficiently attract the visits of the volatile gourmands and are destined either to die out, or to modify their forms and the quality of their nectar. In fact, there actually exists a rivalry among flowers, as to which shall offer the greatest attractions to invite by the visits of insects.

The flower whorls are disposed in well-arranged zones so as to guide the insect to the place where the nectar is stored. At the same time the stamens gently resist the entrance of the insect, thereby covering the latter with more or less pollen, which is shortly afterwards carried by it to another, perhaps female flower, which had attracted the attention of the individual.

But there are flowers of a peculiar construction which only with difficulty permit an insect to approach the store of honey. It is in these cases that the intelligence of insects is perceived, and as Sir John Lubbock says: "It would be difficult to explain the relations between flowers and insects by assuming the latter to have a blind instinct. H. Mueller relates an instance, where a female humble-bee was observed to carefully inspect an *Aquilegia*. It made several ineffectual attempts to suck out the honey; then, having no doubt recognized the uselessness of its attempts, it set to work making a hole in the corolla. Having thus obtained the honey, it went to other flowers of the same plant, and at once attacked them by perforation, without previously trying to reach down the corolla-tube."

The same facts have been noticed in connection with comfrey (*Symphytum officinale*). Fig. 1, *A*, shows the arrangement of the flower, in which the insect is unable to reach the honey by entering the corolla-tube. But the fertilization of the flower is assured nevertheless. For, if we remember that the bee penetrates the corolla below the stamens, it is quite possible that its long trunk, smeared over with the viscid sap, becomes covered with pollen that has fallen down from the stamens. When the insect next visits another flower, it will usually first examine the natural opening, before attempting to bore through the side. And hence, it will usually effect the fertilization by the pollen falling from its trunk during the first inspection of the flower.

Fig. 2 represents a humble-bee feeding off the flowers of *Linaria*. This has flowers which are almost hermetically closed. The nectaries are at the base of the corolla which is protected by a long spur.

Insects have great difficulty in entering the flower; hence, after having in vain attempted to get at the honey in the usual manner, they prefer to perforate the corolla. And they do this at once when the flowers form a closed bud, impossible to be entered by them (see Fig. 3).

Finally we shall cite a fact which, though not exactly of the same kind, yet is likewise of great interest.

Sprengel has noticed that one of the principal obstacles to the fertilization of monœcious flowers, of their own accord, lies in the fact that the male organs do not arrive at maturity at the same time as the female organs. To make up for this, the insects undertake the task of bringing about fertilization. Such flowers often do not hesitate to adopt strong retaliatory measures against their winged guests.

In Aristolochia, for instance, the pistil ripens long before the stamens. As is well known, the corolla of this flower forms a long and deep tube, with narrow orifice and protected by hairs. These hairs are quite coarse and directed inwards or backwards, somewhat resembling an eel-trap. The small insects, mostly diptera, which enter the tube to feed on the honey, are not in the least obstructed, by these hairs; on the contrary, the direction of the latter seems to point out to them where the nectar is concealed. New arrivals enter from time to time, and the interior of the corolla becomes both dining-room and ball-room. But when the gluttons have gorged themselves, they find themselves unable to escape, the exit being beset by insurmountable difficulties. Possibly, thinking themselves condemned to a perpetual captivity, they regret their revelry and bemoan their fate.

Some fine day or other, however, the pistil has become fully developed and is no longer capable of being fertilized. Then the stamens begin to ripen, and the anthers, when opening, cover the prisoners with a quantity of pollen. This is the signal of deliverance. The hairs, which up to this time had guarded the exit, fall off, and the prisoners are at liberty to escape, carrying the pollen to a new trap, where the same process is repeated.

An arrangement analogous in its effects, though much different in form, is found in the case of *Arum maculatum*. Here the insects are likewise imprisoned during some time for the same purpose, but, according to Sir John Lubbock, after a certain period, the maturity of the stigmas is accomplished, and each one pours out a drop of nectar, no doubt as 'a sort of consolation to the prisoners for their captivity.'

While the insects, on the one hand, know those flowers well which agree with them, and while they restrict their visits to a small number of spe-

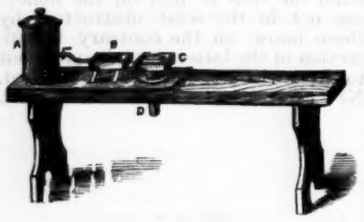
FIG. 2.—Humble-bees feeding on *Linaria*; one by entering the mouth of the corolla, the other by boring through it.

FIG. 1.—Humble-bees feeding on a flower of *Symphytum officinale* L., by boring through the corolla.

FIG. 3.—Abnormally-developed flower of *Linaria*.

cies, the plants, on the other hand, have also their peculiar habits and are well acquainted with their boarders. The so-called sleep of plants is therefore satisfactorily accounted for.

Flowers which are fertilized by nocturnal insects do not need to remain expanded in day-time. In the same manner, those which receive the visits of insects during the day, are thereby advised to close themselves at night. In fact, every moment of time that a flower keeps expanded after its particular insect visitors have retired to rest turns out to its prejudice. It is either exposed to damp air, or to excessive heat, or to attacks by tramp insects, which scatter the pollen without utilizing it. On the other hand, the closed flower has nothing more to fear.—MAURICE MAINDRON, in *La Nature.*



AN IMPROVED LABELLING MACHINE.

MESSRS. DAVENPORT & CO., High Holborn, have lately introduced an ingenious contrivanee in the shape of a bottle-labelling machine, which may prove useful in some businesses. As will be seen from the illustration, the receptacle for gum solution, the pad for transferring gum to the bottles, and the label box are all screwed on a bench, the legs of which are made to fold up for convenience of transport. The *modus operandi* is as follows: The bottle is pressed crosswise on the pad B, which is kept constantly moist with gum from the vessel A; the gum adheres to the bottle, and the next movement in a similar manner on C completes the labelling. A spring in D gives the necessary flexibility for fixing the label, and the machine can be worked with such dexterity that 120 dozen bottles per hour can be labelled effectively.

How to Clean Marble.

A PERSON who has tried many ways for accomplishing the above object thinks the following plan, which he came across in some newspaper, quite the best: Brush the dust off with a piece of chamois, then apply with a brush a good coat of gum arabic, about the consistence of thick mucilage; expose it to the sun or wind to dry. In a short time it will peel off; wash it with clean water and a clean cloth. If the first application does not have the desired effect, it should be tried again. Another method is to rub the marble with the following solution: one quarter of a pound of soft soap, one quarter of a pound of whiting, and one ounce of soda and a piece of stone blue the size of a walnut; rub it over the marble with a flannel, and leave it on for twenty-four hours; then wash it off with clean water, and polish the marble with a piece of flannel or an old piece of felt; or take two parts of common soda, one part of pumice-stone, and one part of finely powdered chalk, sift it through a fine sieve, and mix it with water, then rub it well over the marble, then wash the marble over with soap and water.

To take stains out of white marble, take one ounce of oxgall, one gill of lye, one and a half tablespoonfuls of turpentine; mix and make into a paste with pipe clay; put on the paste over the stain, and let it remain for several days. To remove oil stains, apply common clay saturated with benzine. If the grease has remained in long, the polish will be injured; but the stain will be removed. Iron, mould, or ink spots may be taken out in the following manner. Take half an ounce of butter of antimony, and one ounce of oxalic acid, and dissolve them in one pint rain water; add enough flour to bring the mixture to a proper consistence. Lay it evenly on the stained part with a brush, and, after it has remained for a few days, wash it off and repeat the process, if the stain be not wholly removed.—*Scient. Am.*

Emulsion of Balsam Copaiba with Tincture of Chloride of Iron.*

BY C. W. PHILLIPS.

RECIPE:

Balsam Copaiba...2 drachms.
Powdered Acacia...1 drachm.
Saccharated Pepsin. 1 scruple.
Tr. Chloride Iron..2 drachms.
Water, q. s. to make 2 ounces.

The peculiarity in the above prescription consists in combining the tincture of iron with an acacia emulsion by means of pepsin. Triturate the powdered acacia, balsam copaiba, and pepsin together; then add one and a half drachms of water, and triturate until a perfect emulsion is formed; dilute with half an ounce of water, and pour into a two-ounce, or perhaps preferably in a three-ounce bottle, to allow room for shaking. Dilute the tincture of iron with the remaining water; add to the emulsion, and shake well. A good, thin emulsion is obtained. A sample made some two years ago seems to be in as good condition as ever. A creamy layer separates after standing, but mixes readily on shaking. The above would seem to demonstrate that while tincture of iron and mucilage acacia may be incompatible, yet in the stomach they would not be so. There certainly can be no objection to adding pepsin to an emulsion; and I believe the above will be found a very useful preparation, and relieve druggists of much embarrassment when physicians prescribe balsam copaiba and tincture of iron together with mucilage of acacia.

Commercial Bromide of Potassium.†

BY PROF. VIRGIL COBLENTZ.

AT the suggestion of the Chairman of Papers and Queries, that samples of the same manufacturer's product should be examined at different intervals of time, samples of 6 American and 2 European manufactures were obtained in original unbroken packages in the summer of 1883; and again the same ones in the spring of 1884, this being done in order to ascertain any differences in quality of different lots issued by the same manufacturer during the year. To judge a manufacturer by the examination of a single sample would be unfair, but to examine different lots of his own make would exhibit the *uniformity* of his own product. Considering the quantity of material that the manufacturers turn out at a time, the two examinations within a year would no more than exhibit the variances of his products. Of the 2 foreign samples, 1 was German, the other English, both in cubes. Of the 6 American, 2 were granulated. The Pharmacopœia requirements being of first importance, are first considered, though afterwards a few unofficinal tests were also applied where it might be thought to be of some interest for comparison. The U. S. P., 1870, and Ph. Germ., 1882, tests were also applied secondarily.

* Read at the Thirty-second annual meeting of the Amer. Pharm. Assoc.

† Paper read at the Thirty-first Meeting of the American Pharmaceutical Association. (Slightly condensed.)

Taken in this order of the Pharmacopœias, we have

1.—SOLUBILITY.

Soluble	1	part	in 1.6	parts of water,	U. S. P., '80.
"	1	"	" 200	" alcohol,	at 15° C.
"	1	"	" 1	part " water,	U. S. P., '80.
"	1	"	" 1.6	" alcohol,	boiling point.
"	1	"	" 2	" water,	Ph. Germ.,
"	1	"	" 200	" alcohol,	1882.

The British Ph. states it to be readily soluble in water, and less so in spirit, but does not give exact proportions.

The solubility of the samples as taken in distilled water at 212° F., and in alcohol (of 97 per cent vol.) at 60° F. The solubility in distilled water was taken by adding the powdered salt in small portions at a time to a definite weight of water while boiling in a flask fitted with an inverted condenser, keeping the proportions of water constant; the addition was continued, till the salt was in slight excess, when the saturated solution was quickly decanted from the residue, which was then thrown upon a tared and moistened filter, dried and weighed; the insoluble residue deducted from total amount used, gave quantity dissolved. The solubility in alcohol was ascertained by digesting an excess of the finely pulv. salt in 20 C.c. of alcohol (97 per cent) contained in a closely stoppered tube, and after standing some time, during which it was frequently shaken, it was thrown on a filter moistened with alcohol, and after filtration, a small portion of alcohol was added to force out any adhering solution; the filtrate evaporated to dryness and weighed.

The solubility in alcohol serves to detect only gross impurities to a certain extent, such as carbonates, iodides, free alkalies, etc. The amount of bromide itself dissolved being about 1 part in 200, the amount of impurities dissolved by the alcohol might be roughly calculated from this.

2.—ALKALINITY.

"Faintly alkaline—single crystal laid upon moistened red litmus paper should not at once produce a violet blue stain (absence of more than 1 per cent of alkali)." (U. S. P., 1880.)

"Its aqueous solution does not affect the color of litmus or turmeric" (U. S. P., 1870).

"A few pieces placed on moist litmus should not change the color to violet blue" (Ph. Ger., 1882).

The British Pharmacopœia mentions nothing in regard to the reaction.

The lime-water test may also be added to this, the carbonates being detected by the white turbidity occurring upon the addition of a little concentrated solution of the salt to lime-water.

Since the lime-water test does not reveal less than 1 per cent, and is sometimes less sensitive when the conditions are not closely followed, and the other tests being indefinite, a volumetric estimation of the alkali was made, viz.: 3 grammes of the dried salt having been deprived of water by ignition at a strong heat, were dissolved in about 30 C.c. of water in a beaker, solution of litmus added, and then heated to boiling, decinormal solution of H_2SO_4 was run into the liquid from a burette, until a slight excess remained after the continuance of the heat to expel the liberated CO_2, the solution being of a bright red color. The excess of acid is then inversely titrated with standard KOH solution. From the number of cubic centimeters of acid solution, the amount of pure K_2CO_3 contained therein may be calculated, each C.c. of the normal acid solution corresponding to .0692 grams of anhydrous K_2CO_3.

A small per cent of alkali, though a general feature in most all the medicinal bromides, is hardly objectionable from a therapeutic point. It must, however, be remembered that

the presence of any may cause incompatibilities in solutions such as contain alkaloids, iron salts, etc. In such cases, where the salt is supposed to be alkaline, it is best to be first dissolved, tested with litmus, and if the reaction be alkaline, neutralized with dilute H-Cl [or HBr] before adding the alkaloidal salt

3.—BROMATE.

"If dilute H_2SO_4 be dropped upon crushed crystals of the salt, they should not at once assume a yellow color" (U. S. P., 1880).

"When its solution in water is mixed with a little chlorine, . . . chloroform agitated with it, on falling to the bottom, exhibits a red color" (Br. P.).

"If spread in powder form on a porcelain plate, it should not be colored yellow immediately on addition of H_2SO_4" (Ph. G., 1882).

"In aqueous solution it may also be detected by the liberation of bromine upon addition of a few drops of H_2SO_4 dil., imparting a yellow color, which, upon subsequent agitation of the solution with a few drops of CS_2, will be absorbed by the latter." (Hoffmann and Power, Anal.)

The U. S. P. and Ph. Germ., essentially the same, both depend on the immediate coloration of the salt on the addition of H_2SO_4; this test is practically a close one when carefully followed. Of course, the presence of this salt should always be avoided by the manufacturers, and, when present, it is there from carelessness or neglect of proper precautions in manufacture. Since the bromate is well known to be poisonous, though reducing agents do not liberate the free bromine as readily as iodine from the corresponding iodate, as might be possible in the stomach, still as potassium bromide is generally given in much larger doses than the iodide, the presence of more than traces of bromate would render its administration inadmissible.

4.—IODIDE.

"If one gramme of the salt be dissolved in 10 C.c. of water, some gelatinized starch added, then a few drops of chlorine water be carefully poured on top, no blue zone should make its appearance at the line of contact of the two liquids" (U. S. P., 1880).

"A solution of the salt mixed with mucilage of starch and a drop of an aqueous sol. of bromine or chlorine, does not exhibit any blue color" (B. P.).

"A solution of one gramme of salt in 100 C.c. of water should not, after the addition of a few drops of Fe_2Cl_6, impart a violet color to chloroform" (Ph. Germ., 1882).

Bonis recommends adding a few drops of Fe_2Cl_6 to a test tube containsol. of KBr and heating to a gentle ebullition, when the iodine is precipitated, while the bromine remains intact. This makes a very delicate test, even for traces. In performing the U. S. P. test, care should be taken, in adding the chlorine water, not to add too much at once, since in the presence of the iodine, the excess of free bromine liberated may in every case mask the reaction. Advantage of this reaction has been made use of in the separation of iodine from bromide of potassium. The contaminated salt is dissolved in water, and then bromine water is added in small portions at a time to the solution heated to boiling, until it is present in excess. The solution is then evaporated to dryness, thus driving off the iodine. Iodine, though not often an impurity in bromine at present, still might occasionally occur in poor samples, and in this way enter as an iodide in the manufacture. An intentional adulteration with the iodide in any quantity is not probable, considering the difference in the market value, although some years ago the presence of iodides in bromide was of frequent occurrence in the English market—probably added for the reason that the bromide, when containing any iodide, crystallizes in much larger crystals, also enhancing the beauty and appearance of the salt.

5.—SULPHATES (LIMIT).

"On adding to one gramme of salt, dissolved in 20 C.c. of water, five or six drops of test solution of $BaNO_3$, no immediate cloudiness or precipitate should make its appearance" (U. S. P., 1880).

"20 grammes of solution (1 to 20), to which 4 drops of $BaNO_3$ solution have been added, should not become cloudy" (Ph. Germ., 1882).

Should the salt be very alkaline, a drop or so of HCl should be added.

6.—CHLORIDES.

"If three grammes of well dried salt be dissolved in distilled water to make 100 C.c., and 10 C.c. of this solution be treated with a few drops of test sol. of $K_2Cr_2O_7$, and then volumetric sol. of $AgNO_3$ be added, not more than 25.7 C.c. of the latter should be consumed before the red color ceases to disappear on stirring (absence of more than three per cent of chloride)" (U. S. P., 1880).

"When distilled with a mixture of bichromate of potash and sulphuric acid, it yields a red liquid (distillate), which is decolorized on the addition of aq. ammoniæ in excess, but must in no case turn yellow, which would indicate the presence of chlorine" (Ph. Germ., 1870).

The latter test depends on the formation of chloro-chromic anhydride, while the process of 1880 is that in main part first recommended by Baudrimont, the presence of iodides, carbonates, sulphates, and nitrates, in any quantity, rendering the test useless.

An excellent and convenient qualitative test that might do well to apply to a suspected salt before attempting the assay is given by Hager, depending on the fact that bromide of silver is but sparingly soluble in cold dilute solution of ammonium carbonate, while the chloride is freely soluble. A portion of the salt dissolved in water is completely precipitated by $AgNO_3$, washed, digested with cold saturated solution of ammonium carbonate, filtered, and the filtrate supersaturated with HNO_3. The production of a white precipitate indicates chlorides.

It being almost impossible to entirely free the commercial bromine from chlorine without enhancing the cost of it to a great extent, we must expect the presence of some chloride in commercial samples. It seems to be generally accepted that the limit should be placed at three per cent, as given by the Pharmacopœia.

The requirements of the U. S. P. test were applied in all cases, though in some, where there were carbonates, nitrates, etc., present to a considerable extent, the test was considered of no value, and on this account some of the tests were dropped from the table.

Now, if the salt be *pure* KBr, 25.21 C.c. of the silver solution will be required. Since 25.21 C.c. contain 0.4284 gramme of nitrate of silver, then this will react with 0.3 gramme of bromide of potassium:

$$\underset{170}{AgNO_3} : \underset{119}{KBr} = 0.4284 : 0.3$$

If the salt be pure potash chloride, 40.26 C.c. of the silver solution will be required.

The difference in amount of silver solution required for the three decigrammes of the two salts will then be 40.26 C.c. − 25.21 C.c. = 15.05 C.c. Then for *each* 0.1505 C.c. of silver solution required in *excess* of 25.21 C.c., to effect complete precipitation, one per cent of potassium chloride will be present, since 15.05 ÷ 100 = 0.1505.

[*Example.*—If 0.3 Gm. of a sample of bromide of potassium, known to contain only KCl as impurity, should require for complete precipitation 28.5 C.c. of decinormal silver solution—(0.3 Gm. of pure KBr only requires 25.21 C.c.)—there would have been 3.29 C.c. too much of the silver solution consumed. As each 0.1505 C.c. in excess corresponds to 1% of KCl, there must be present altogether 28.1% KCl (3.29 ÷ 0.1505 = 21.8). The sample, therefore, contained only 78.2% of pure KBr. We have used the author's example, but have presented it in a condensed form.—ED. AM. DRUG.]

Those tests that depend on the gravimetric and volumetric estimation of the silver, by weight of silver precipitate obtained, or volume of silver solution required for precipitation, require accurate operations with a perfectly dried salt, and should there be more than one impurity present, their results are of little or no value.

7. ESTIMATION (GRAVIMETRIC).

"One gramme of powdered and dried salt, when completely precipitated by nitrate silver, yields, if perfectly pure, 1.579 grains of dry bromide of silver" (U. S. P., 1880).

"Ten grains of it require, for complete precipitation, 14.3 grains of nitrate of silver" (U. S. P., 1870).

"Ten grains require, for complete decomposition, 840 grain measures of the volumetric solution of nitrate silver" (Ph. Br.).

It will be seen that the U. S. P. of 1870 and 1880 correspond closely; the B. P. test being more of a volumetric than gravimetric test.

In the U. S. P. test, should the solution be pure potassium bromide, the amount of AgBr obtained would be 1.58 grains; should it contain potassium or sodium chloride, the weight, provided the salt is free from other impurities, will be greater in proportion to the amount of impurities present, since the molecular weights of the *others* are lower. This latter forms a kind of check test, which might be applied first, giving an idea as to the nature and proportion of the adulterants, should there be any.

8.—MOISTURE.

Determined by loss of weight when the salt is dried at 100° C. (212° F.).

"When subjected to heat, does not lose weight" (U. S. P., 1870).

"At a dull red heat the salt melts without losing weight" (U. S. P., 1880).

9.—NITRATES.

Bromide of potassium, contaminated to a considerable extent with nitrates, has appeared in the English market occasionally in past years; in view of this, the specimens were examined for this radical. If the salt be free from bromate, nitrates may be detected by the intense yellow coloration, when a portion of the powdered salt is heated to the boiling point with an excess of dilute H_2SO_4; also another test was to precipitate with an excess of Ag_2SO_4 to remove Br, then to test the filtrate by the addition of a crystal of Fe_2SO_4, and H_2SO_4, the development of a brown black color being indicative of nitrates.

10.—SODIUM.

The U. S. P. and Br. Ph. only give means of identifying it as a potassium salt by precipitation with tartaric acid. The Ph. Ger. requires that it should give a violet tint to a colorless flame from the beginning.

The conformity of the samples with the Pharmacopœia requirements are given in the following synopsis, while of those not given, the results are so evident as not to require it.

With few exceptions all the samples are soluble in a lesser quantity of water than that required by the Pharmacopœia, and like results with alcohol,

in which case the less pure the sample the greater the apparent solubility.

Eleven of the sixteen samples examined gave an alkaline reaction, though some were to a very slight degree, and would answer well the practical requirements of the prescription counter, while others should be discarded.

Only one sample gave evidence of bromate in any quantity that should discard it, according to the Pharmacopœia requirements, the two others giving but faint traces. Only one exhibited any traces of iodide, and that was probably present as slight impurity in the bromine.

In eight out of the sixteen samples, no figures for the estimation of chlorides are given, since, as before stated, the amount of carbonates and sulphates present would interfere with an accurate determination, while the remaining ones that are given may be taken for what they are worth, though in these samples the impurities present are hardly in quantity sufficient to interfere with the accuracy of the estimation to any extent.

The largest amount of moisture is found in one of the granulated samples, the two foreign ones being among the least.

Nearly all give the yellow sodium flame at first. It is a very strong requirement on the part of the Pharmacopœia, since the presence of the smallest trace of sodium would give rise to a yellow flame.

On reviewing the results, it is evident that the impurities, with one or two exceptions, are not of such a nature as would give rise to any difficulty as regards their therapeutic application, but many, if not 25 per cent of them at the very least, would be liable to give rise to difficulties when applied to the manifold and often exacting requirements of the prescription counter, the presence of the carbonates, chlorides, and sulphates in some cases not only being annoying to the dispenser, but also seriously objectionable, from incompatibilities that are liable to arise.

Adrian states that of French bromides, among ten samples obtained, only one was found pure, the others containing from 10 to 15 per cent of impurities, one even 35 per cent, these being carbonates, chlorides, iodides, and sulphates.

The eight samples examined, I think, very fairly represent our market as it now is supplied to the retail trade; and two examinations of each maker's product, taken from eight to ten months apart, will allow a fair representation of the probable variations of the quality of his goods. The foreign samples are those put forth by foreign makers of high standing, and it will be seen that three of our American samples stand fully equal to, if not better in some particulars, than the European (Nos. 4 and 8).

Of the two granulated salts, one averages very well, and sustains the claim as to its quality, while the other is not much better than the poorer samples.

Since bromide of potassium is usually given in much larger doses than the corresponding iodide, and in some instances frequently in large quantities, it is of considerable importance that it should be dispensed in a reasonably pure state, free from admixture with other salts or foreign substances which might produce powerful effects upon the system. Therefore, while considering the average quality of our supply of this salt to be *very fair* (though some of our so-called reliable brands are better than this), it behooves the buyer to exercise some care in his selection, in order to obtain a medicinal salt meeting the pharmacopœial requirement. Too often are these all-important points overlooked, and the quality of the salt disregarded in order to meet the lowest market figure. The manufacturers need the encouragment of an intelligent appreciation on the part of the retail pharmacist in order to raise the standard of their products.

Considering the strong and wide-awake competition, characteristic of these later days, should we not ask manufacturers to stimulate the demand for a better quality of their own products? It is obviously the duty of pharmacists of to-day to lend encouragement by placing a premium on the best medicines, thus encouraging the manufacturers in their efforts.

Results.*

Solubility of 1 part in....parts of water at 100° C. I, 0.907; 0.946. II, 0.986; 0.948. III, 0.965; 0.943. IV, 1.11; 1.08. V, 0.931; 0.942. VI, 0.986; 1.02. VII, 0.991; 1.01. VIII, 0.921; 0.932.

Solubility of 1 part in..parts alcohol (97% vol.) at 15° C. I, 153.5; 161.4. II, 173.7; 159.8. III, 168.2; 160.1. IV, 172.1; 167.2. V. 180.1; 120.2. VI, 127.8; 133.2. VII, 116.8; 114.2. VIII, 199.5; 199 1.

Reaction, U. S. Ph. '80. Color to litmus.
I, Slight alkaline; strong alkaline, II and V, Both neutral. III and VII, Strong alkaline: alkaline. IV and VI, Both alkaline. VIII, Neutral; alkaline.

Reaction, U. S. Ph. '70. Color to litmus.
I and III, Blue; deep blue. II and V, Both no change. IV and VII, Both deep blue. VI, Deep blue; violet blue. VIII, No change; deep blue.

Reaction, mixed with lime water.
I and VII, Cloudy; precipitate. II and V, Both clear. III, Cloudy. IV and VI, Both faint cloudy. VIII, Clear; faint cloudy.

Alkali. Volum. estimation of K_2CO_3, in per cent.
I, 0.92; 1.01. II, 0.02; 0.01. III, 1.47; 1.38. IV, 1.21; 1.37. V, 0.06; 0.02. VI, 2.07; 3.10. VII, 1.09; 1.15. VIII, 0.011; 0.018. (Standard only II. V, VIII.)

Bromate. Dil. H_2SO_4 on Pulverized Salt, U. S. P. '80.
I, II, III, V, VII, VIII, both no color. IV, no color; light yellow. VI, yellow; no color.

Bromate. Aqua Chlori and Chloroform added (Br. Ph.).
I, III, V, VIII, Both no color. II, IV, and VII, No color; pale straw color. VI, Deep yellow; no color. (I, III, V, VIII, are standard.)

Iodides. Solution 1 in 10, with starch, U. S. '80.
I, II, III, IV, V, VII, VIII, Both no color. VI, No color; faint bue.

Iodides. Solution 1 in 100 with F_2Cl_4 and chloroform. VI, No color; faint blue. Others: No color.

Chlorides. Per cent.
I, IV, VI, VII,? II. 5.3; 6.6. III, 3.3; 8.6. V, 4.2; 4 6. VIII. 4.1; 4.9.

Sulphates. Addition of Barium nitrate, U. S. '80.
I, II, V, VII, clear. Others: not quite standard, part being cloudy or faint cloudy.

Moisture. Loss, at 100° C., per cent.
I. 0.3; 0.2. II, 0.2; 0.5. III, 1.5; 1.2. IV, 0.9; 0.4. V, 0.7; 0.5. VI, 1.1; 0.4. VII, 1.2; 0.9. VIII, 0.4; 0.6.

Estimation, gravim. 1 Gramme, precipitated by silver nitrate, as Ag. Br.
I, 1.58; 1.60; II, 1.578; 1.612. III, 1.48; 1.587. IV, 1.581; 1.585. V, 1 159; 1.602. VI. 1.99; 1.65. VII, 1.581; 1.579. VIII, 1.586; 1.592.

Sodium, presence of, by flame test, Ph. Germ.
I, IV, VII, VIII, both samples give yellow at once. II, VI, both give violet (K) at once. III and V, yellow; violet.

Potassium, identification of base as such in all samples.

Nitrate, presence of. Boiling with H_2SO_4. One sample contained traces.

Prof. Robert E. Rogers, of Jefferson Medical College, has resigned the chair of chemistry.

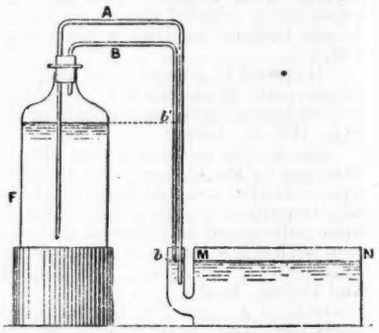
Fluid Extract of Serpentaria is said by Mr. T. S. Wiegand (*Am. Journ. of Pharm.*) to be an efficient antidote to rhus poisoning when applied on cloths and without friction.

*[To save space, we have recast the author's table, giving, however, all of his data. As there were two different samples examined of each manufacturer's product, we have placed a semicolon (;) between the data referring to the two samples of one maker. —Ed. Am. Drugg.]

WATER-BATH WITH CONSTANT WATER LEVEL.

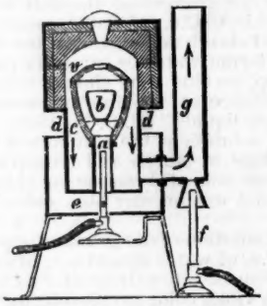
Dr. Eugene Mascareñas y Hernandez uses the below-described apparatus for preserving a constant water-level.

The water-bath is provided with a lateral neck, communicating with the interior of the water-bath. In the cut, this neck appears to be situated close to the water-bath itself. It would, however, be an advantage to have it project out a short distance horizontally from the bottom of the vessel, before it turns upwards. This would avoid the interference of the glass tubes with



the edge of any larger-sized capsule placed on the bath.

The reservoir for water is a bottle tightly stoppered and through the stopper of which two glass tubes pass bent twice at right angles, one of which terminates just below the stopper, and the outer limb of which ends at the exact level at which the water in the bath is to be kept, while the other tube extends to the bottom of the reservoir with one limb, and with the other to some distance down the neck of the water-bath. As soon as the siphon (tube *A*) has been started, the water will flow from the reservoir until the end of the tube *B*, at *b*, becomes closed by the water, when the flow will cease, to begin afresh as soon as the level sinks.—*La Nature.*



GAS-FURNACE FOR HIGH TEMPERATURES.

H. Rœssler describes an improved gas-furnace, of small size, for producing high temperatures in laboratories. It requires only two ordinary Bunsen burners for producing heat and draught. Its construction is very simple, as will be seen from the accompanying cut, which represents a section of the furnace.

The air which supplies the burner enters at *d* and *e* where it becomes heated before entering the burner and before ascending alongside of the latter. The combustion of the mixed gas and heated air takes place inside of the inclosed space *c*, and the products of combustion escape at *v*, passing down at the outside of the mantle *c*, and thereby utilizing the heat to the utmost extent. A constant draught is produced by the burner *f*, which causes an ascending current through the chimney *g*.

This furnace, if well regulated, will melt silver in 15, gold in 20, and a mixture of 90 parts of gold and 10 of platinum in 40 minutes.—*Dingl. Pol. Journ.*

Hydrastine.*

BY PROF. FREDERICK B. POWER, PH.D.

HYDRASTINE was observed by Durand, of Philadelphia, as early as 1851, but was not obtained in a pure state. It was afterwards studied by J. D. Perrins, of Worcester, England (1862), and subsequently (1863) more fully by Mahla, of Chicago, who assigned to it the empirical formula $C_{22}H_{24}NO_6$, which was recalculated by Kraut into $C_{22}H_{23}NO_6$.

Professor Power's investigation was undertaken to verify this formula. The alkaloid was prepared for him by Professor J. U. Lloyd, of Cincinnati, in a very pure state, by the following process:

One thousand pounds of powdered Hydrastis canadensis were properly moistened with alcohol, packed in a suitable percolator, and percolation then conducted with the use of officinal alcohol as a menstruum. Sulphuric acid, in strong excess, was added to the percolate, and, after four hours, the supernatant liquid filtered from the mass of crystals of sulphate of berberine ($C_{20}H_{17}NO_4.H_2SO_4$). To this filtrate ammonia water was added until it showed but a slightly acid reaction, then strained to separate the precipitated sulphate of ammonium, distilled to a syrupy consistence, and the residue poured into ten times its bulk of cold water. After twenty-four hours, the precipitated resinous substances, oils, etc., were separated from the liquid by filtration, the filtrate being an impure solution of sulphate of hydrastine. Ammonia water, in decided excess, was then added to this resultant liquid, and the precipitate of impure hydrastine collected and dried. It was then digested with one hundred times its weight of cold water, to which sulphuric acid was carefully added to *slight* acid reaction, and, after twenty-four hours, filtered. The filtrate was again precipitated with excess of ammonia water, the precipitate collected on a strainer and dried. This precipitate was powdered and extracted with boiling alcohol, from which impure, dark-yellow crystals of hydrastine separated when the alcoholic solution was cooled. The crystals were purified by repeated crystallization from boiling alcohol. In order to obtain the hydrastine perfectly colorless, when in the form of large crystals, many crystallizations are necessary. Small crystals appear to be white, when in reality they are considerably colored, and which is partly due to the fact that they are prone to become opaque from the presence of numerous fractures.

PHYSICAL PROPERTIES OF HYDRASTINE.

The crystals of hydrastine which apparently belong to the ortho-rhombic system, are anhydrous, and, when pure, perfectly colorless and very brilliant. They fuse at 132° C. (Mahla, *loc. cit.*, states 135° C.) to a light amber-colored liquid. When heated on platinum foil they decompose with the evolution of empyreumatic inflammable vapors, reminding, as Mahla had previously observed, somewhat of carbolic acid, and leaving a large amount of ash, which burns slowly away at a red heat.

Hydrastine is insoluble in water and in petroleum benzin, these liquids leaving, after prolonged contact with the alkaloid, no perceptible residue upon evaporation, and the aqueous liquid is not affected by potassio-mercuric iodide; it is soluble, however, in dilute acids and in chloroform (in 1.75 parts), benzol (15.70 parts), ether (83.46 p.), and alcohol (120.27 p.), and, of course, much more freely soluble in these liquids when hot.

Its specific rotary power is (α) D = − 170°.

Chemical Properties:

The crystals of hydrastine are affected in the following manner by reagents.

Concentrated sulphuric acid produces a yellow color, which, in contact with a crystal of potassium bichromate, becomes brown.

Concentrated sulphuric acid, on warming, produces a bright-red color.

Concentrated nitric acid produces, in the cold, a yellow color, changing to reddish-yellow.

Concentrated hydrochloric acid gives no coloration, either in the cold or upon warming.

Concentrated sulphuric acid and molybdate of ammonium gives an olive-green color, which appears to be its most characteristic test.

The solution of the hydrochlorate is affected as follows by reagents.

Ammonia water and the fixed alkalies give a white curdy precipitate, sparingly soluble in excess; potassium iodide, potassio-mercuric iodide, potassium ferrocyanide, potassium sulphocyanide, mercuric chloride, and tannic acid produce white precipitates; iodine in potassium iodide, a light-brown precipitate; potassium bichromate, a yellow precipitate; picric acid, a bright-yellow precipitate; platinic chloride, an orange-yellow precipitate; auric chloride, a deep yellowish-red precipitate.

The ultimate analysis of the alkaloid was performed by its combustion with oxide of copper, in a tube provided with a glowing copper spiral. . . .

The figures obtained in the analysis confirmed the correctness of Mahla's formula.

The *hydrochlorate of hydrastine* is uncrystallizable (so also described by Mahla). Its composition is $C_{22}H_{23}NO_6$. HCl.

The *sulphate* which Prof. Power first prepared is also uncrystallizable, of a light-brownish color, affording a nearly white powder. Its composition is $(C_{22}H_{23}NO_6)H_2SO_4$.

It should be stated here that the *crystallized* sulphate of hydrastine advertised by some manufacturers is simply the acid sulphate of the yellow alkaloid berberin [$C_{20}H_{17}NO_4.H_2SO_4$], to which the name hydrastine is persistently misapplied.

The nitrate is, like the previously described salts, uncrystallizable, the acetate is permanent only in solution, decomposing on evaporation. Attempts to prepare a crystallizable salt containing organic acids were fruitless, since the alkaloid invariably separated. It follows, therefore, that hydrastine is a very weak base, and does not form crystallizable salts.

A commercial preparation termed "soluble citrate of hydrastine," appearing as a yellowish-gray amorphous powder, very soluble in water (with exception of a little resinous residue), was found on examination to be a mixture of about one molecule of the alkaloid and fifteen molecules of citric acid; the large excess of the latter, therefore, is the cause of the ready solubility.

Prof. Power obtained from hydrastine a compound analogous to hydroberberine, namely "hydro-hydrastine," which has, however, not yet been fully examined. At all events, its hydrochlorate was found to contain the theoretical proportion of hydrochloric acid. [Calculated for $C_{22}H_{27}NO_6.HCl$. 8.34% of HCl. Found: 8.31% HCl.]

With iodine and bromine, hydrastine also enters into combination; with the former it forms a crystalline compound.

From the circumstance that, by heating hydrastine with ethyl iodide for several hours, a compound is formed in which one atom of the hydrogen of the alkaloid is replaced by one molecule of ethyl, it may be inferred that hydrastine is a secondary base or so-called imide, in which respect it is analogous to berberine.

In concluding this investigation, a few words may be said regarding the supposed third alkaloid of Hydrastis canadensis, the so-called *xanthopuccine*. The presence of such an alkaloid was first intimated by A. K. Hale, afterward confirmed by John C. Burt, and finally by Herman Lerchen, who endowed it with a name. The very peculiar properties, for an alkaloid, which were ascribed to this substance by Mr. Burt, would render it extremely interesting, since he states that "the hydrochlorate solution gave with ferric chloride a dark brown to black solution, and with potassium ferrocyanide a greenish-blue solution, while the fact of its precipitating lead acetate is not quite so remarkable, in view of the sparing solubility of lead chloride."

With a desire to examine this substance more carefully, I applied to Prof. Lloyd for a specimen of it, and was not greatly surprised to learn from him that in working upon thousands of pounds of Hydrastis, he had never been able to obtain it.

* Abstract of a Paper read at the Meeting of the Amer. Pharm. Assoc., at Milwaukee, August, 1884.

Proportion of Water of Hydration in commercial Sulphate of Quinine.*

BY HENRY B. PARSONS, NEW YORK.

THE following percentages were determined by drying one gramme of the quinine sulphate in a water oven, for three hours. Repeated trials have proven that all the moisture is expelled by this treatment.

Brand.	No. Samples.	Average % Moisture.
1. American	16	13.72
2. "	184	12.61
3. German	12	12.32
4. "	634	14.09
5. Italian	199	14.36
Av'ge for all	1015	13.84

The writer has observed that the differences above noted in the amounts of crystal water in the five brands here reported is tolerably constant and characteristic for each brand. With careful handling and no more exposure to the air than is necessary, quinine sulphate will contain almost exactly seven molecules of crystal water $7H_2O$ equivalent to 14.45 per cent. But if facilities for drying are not the best, and if workmen are careless and leave the sulphate exposed to the air for too long a time, the amount of crystal water will be less than seven molecules, and is likely to vary considerably in different lots.

This statement is applicable to the brands here reported as No. 1 American and No. 3 German. No. 2 American showed much less variation for different lots; the appearance of the crystals was unlike that of all other brands. The amount of crystal water so closely approximated six molecules, $6H_2O$ of 12.53 per cent, as to raise the question whether the manufacturer, by some particular method of crystallization, did not originally produce this salt rather than the one containing seven molecules.

The brands reported as No. 4 German and No. 5 Italian were very constant as regards their content of crystal water; it will be noted that they contained, approximately seven molecules or 14.45 per cent. Not infrequently twenty or more samples would be examined at one time, of which not one sample would contain less than 14 per cent of water of hydration, and not one sample more than 15 per cent.

Each sample here reported represents 100 ounces of quinine sulphate, taken from an original can, not previously opened. These determinations of crystal water were made previous

* Paper read at the meeting of the Amer. Pharm. Assoc., at Milwaukee, Aug., 1884.

to the application of Kerner's test as directed by the U. S. Pharmacopœia.

The average percentage of moisture found in the 1015 samples, of five makers, has been stated as 13.84 per cent. This is a trifle more than 6½ molecules, which requires 13.56 per cent. There are numerous interesting questions connected with this subject, which, it is hoped, may be considered in any discussion which may arise in consequence of the reading of this paper.

One question which the writer would suggest, and upon which an expression of opinion is desirable, is based upon the following facts. It is well known that ordinary quinine sulphate rapidly loses its crystal water when exposed to the air; until only two molecules, or 4.6 per cent of combined water remains, but when this point has been reached, the salt neither gains nor loses moisture to any appreciable extent, even if it be freely exposed to the air. In view of the definite and stable character of this two-molecule salt, would it or would it not be advisable to adopt it in the next (7th) revised edition of the U. S Pharmacopœia?

As this question is hardly germane in this paper, it is merely suggested as one which may lead to profitable discussion in connection with the results here offered.

Fig. 1

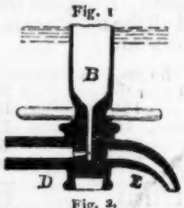


Fig. 2.

IMPROVED BURETTE STOP-COCK.

SELF-FEEDING burettes are usually so arranged that they may be filled from the reservoir containing the stock-reagent, by merely pressing a pinch-cock. One method of accomplishing this is shown in the cut illustrating the overflow pipette described in our last number (p. 148). Pressure on one pinch-cock fills the burette, and pressure on the other allows the liquid to drop or run from the latter.

This arrangement is sufficiently simple and handy to satisfy most operators. Nevertheless, it might be considered an improvement, in the estimation of some, to replace the two pinch or stop-cocks by a single one. This has been done by Ephraim Greiner, of Stützerbach (Thuringia), who has patented the glass stop-cock here illustrated.

B is the lower end of the burette. The faucet with which it is provided sits in a tube one side of which, *D*, is connected with the reservoir containing the standard solution, while the opposite branch, *E*, ends in a downward nozzle from which the liquid runs into the vessel placed below. The body of the glass faucet is perforated, not in the direction of its diameter, but in that of two radii inclosing a quadrant.

When the faucet is turned in the position shown in 1, the liquid in the reservoir will flow into the burette, and as soon as it has reached the desired level, the faucet is slightly turned, until it stands in the position 2, in which case all the passages are closed. On turning it now further, into the position 3, the liquid will run from the nozzle, until it is turned back to position 2.

Canutillo.*

BY J. W. COLCORD.

EARLY in the spring of the present year, in the course of a correspondence with Dr. S. Gleason, of San Antonio, Texas, in reference to the cultivation of foreign medicinal plants in that vicinity, he offered two samples of a shrub plentiful there, that had interested him. He describes it as a shrub growing to the height of from three to four feet, densely branched above—branches ternate, smooth, leafless, or the leaves reduced to small subspinous petal; flower-buds axillary, either opposite, or in whorls of 3 or more, downy, calyx of 2 or 3 scaly sepals.

Whether it has a corolla or not he neglects to state; but I judge from appearance that it must have a small yellow blossom. In the course of his practice he says he has found Canutillo (pronounced Can-a-teelyo) to be used extensively by the native Indians and others resident in that section, in the treatment of gonorrhœa, mucal inflammation of the urethra, leucorrhœa, renal diseases, etc., and when bruised is frequently used as a vulnery and styptic.

As used for internal administration, it was given in the form of an infusion, the dose being a teacupful 3 or 4 times a day.

As this method of administration is manifestly inadmissible for use in our pharmacies, I made the experiment of preparing a fluid extract from a pound or more of the stems received by mail some time in March, promising the doctor that I would communicate the results of my experiments both therapeutically as well as pharmaceutically.

The fluid extract, as prepared by me, of which I submit a sample, is in color a reddish dark brown, in taste sweetish, aromatic, and astringent.

I have called the attention of several of the physicians in my neighborhood to it, and they have prescribed it.

I have also had a trial made of it in the hospital. The dose that I recommend is a teaspoonful 4 times a day. In each case, as far as I can learn, the results have been satisfactory. One patient reported a case of gonorrhœa cured by it alone in three days, using but one ounce of the extract.

Dr. Gleason states that he can, from the results of his experience in using it, almost claim that is a specific in this disease. Whether further trial shall confirm or refute the present good opinion I have formed in regard to its therapeutic value, time and the judgment of others must determine. I take pleasure in submitting for your inspection a sample of the dried shrub.

I have consulted a large number of authorities to obtain the botanical name, but so far have been unable to find anything answering its description.

Canutillo is derived from the Spanish Cana, meaning a litttle reed or stem. A sample sent to the Herbarium at Cambridge, asking information as to its classification, elicited following response: "Your shrub is an Ephedra (apparently Ephedra trifurcata), now common on our Southern borders. All our species of Ephedra are popular local remedies in syphilitic complaints."

I sent a specimen to Mr. E. M. Holmes of London, with a similar request for information, particularly as to whether a trial had ever been made as to the therapeutic value, but so far have received no response. It seems to me to be worthy of a further trial. And if any member desires to make a trial, I have no doubt but that supplies could be obtained of Dr. Gleason, at small expense, on application.

* Paper read at the meeting of the Amer. Pharm. Assoc., at Milwaukee, Aug., 1884.

Artificial Oil of Wintergreen.*

BY ADOLPH W. MILLER, M.D.

"GOOD authority states that artificial salicylic acid is now used in making oil of wintergreen, and that this artificial oil is cheaper than the natural. To what extent is this true?"

This query may be very briefly answered in the negative. Inquiries and investigations pursued for the past year in various ways among the most extensive and reliable dealers in essential oils have failed to furnish the slightest evidence of the correctness of the above statement. It is quite true that the trade lists of several of the larger manufacturers quote "Salicylate of Methyl," but it is always at an advance on the price of the oil of wintergreen. This salicylate of methyl is freely admitted to be artificially produced from wood alcohol and salicylic acid. The small demand which has sprung up for this article seems to be entirely due to the publication of a number of absurd formulæ for artificial flavoring extracts in the United States Dispensatory, in which salicylate of methyl forms one of the numerous ingredients.

At the present high price of salicylic acid, and the comparatively low rate of oil of wintergreen, it would hardly pay to substitute the artificial for the natural product. It is not to be denied, however, that this obstacle would not prove to be a barrier to the industry in the hands of the firm which holds the monopoly of Kolbe's patent for making salicylic acid, as additional large amounts of this article could thus be disposed of. The price realized would no doubt afford a liberal profit to this firm, though it would be unremunerative to those who have to pay a heavy royalty on the manufacture of the acid. On the other hand, if the price of oil of wintergreen should at any time advance to about $3 or over, this might prove to be a sufficient inducement for others also to substitute the chemical product for that of Nature

Comparative Accuracy of the Officinal Methods of Opium Assay.*

BY WM. W. BARTLET.

THE subject of the assay of opium has been so ably treated by Prof. Prescott, Dr. Squibb, and others, that there seems to be but little left to suggest or discuss. This is a very important subject to pharmacists, especially so to those who reside in States that have passed stringent adulteration acts. This has been brought home to the pharmacists of Massachusetts during the past winter in a very substantial manner. The activity displayed by our efficient drug analyst has struck terror to the soul of the adulterater. It was found that opium and preparations of opium were persistently and systematically adulterated; that is, if the record of their analysis goes for anything. Thus, in the case of laudanum, which should assay at least 1.20 per cent of morphine by the U. S. P. process, one assay showed that the laudanum had been adulterated to the extent of one-third, another, one-half, and still another, very nearly three-quarters—showing that those engaged in this business were quite systematic in their operations. The processes selected as representing standard authorities were those of the U. S. P., German Pharmacopœia, and British Pharmacopœia, my object being to ascertain which process most thoroughly exhausted the drug of morphine, or, in other words, which process produced the most morphine. I had simply to proceed to assay the opium by the three different methods, and compare the results.

* Paper read at the meeting of the Amer. Pharm. Assoc., at Milwaukee, Aug., 1884.

Three samples of powdered opium were taken, and an assay made of each sample by each of the three processes, making nine assays in all. In using the U. S. P. process, I found that certain details which could not be properly put into the Pharmacopœia, were quite useful in carrying out its requirements. Thus, the freshly-slaked lime should be in the powdered form. This can be done by using lime, three parts, and water, one part.

The quantity of slaked lime directed to be used is intended to be in excess, so that if a little more is used there will be no harm done. Hence it can be weighed in a larger balance, if it is more convenient to do so.

Then the ammonium chloride is also in excess, and can also be weighed on a large balance, care being taken, however, to have at least the *full* quantity. The commercial ammonium chloride, in the form of crystal, was carefully powdered in a mortar each time, as the powdered ammonium chloride of the market should not be relied on for purity.

Then the filter should be wet with ether before decanting the ethereal layer upon it, for it is the ether that we wish to pass through first, and thus hasten the process.

A fine glass rod was used to decant upon the filter. In decanting the ethereal layer, there is no absolute necessity for being particular to decant only the ethereal layer, for at least one-half the other liquid will be carried along with it in any event. I found it convenient, in washing the crystals with ether, to do so with a two C.c. pipette.

After the crystals have been washed with ether, they need to be dried in the air only long enough to get rid of the ether, perhaps an hour. This is necessary, in order that the rest of the liquid, when added, will filter readily.

I have spoken of these points rather more in detail than I otherwise should, for the benefit of those who may have met with these difficulties, and have not clearly seen their way out of them.

The results of the three samples assayed by the U. S. P. process are as follows:

No. 1, 12.50 per cent of morphine.
" 2, 12.48 " " " "
" 3, 13.40 " " " "

The crystals were quite well defined, and quite light colored. Samples of opium No. 1 was quite dark colored; samples Nos. 2 and 3 were quite light colored; which shows that the color of the opium is no guide to its morphine strength; and, indeed, I have found that the physical appearances of powdered opium as a rule give no clue to its morphine value.

The result of the same three samples assayed by the process of the German Pharmacopœia are as follows:

No. 1, 8.50 per cent of morphine.
" 2, 10.50 " " " "
" 3, 9.25 " " " "

The crystals were quite light colored and somewhat larger than those produced by the U. S. P. process. This process is somewhat tedious, the liquids all being required to be weighed. The crystals of morphine were dried at between 70° C. and 80° C. till they ceased to lose weight, rather than at 100° C., in order to make sure that none of the morphine be lost. This process claims ten per cent of morphine.

The results of the same three samples assayed by the process of the British Pharmacopœia are as follows:

No. 1, 5.12 per cent of morphine.
" 2, 8.25 " " "
" 3, 3.42 " " "

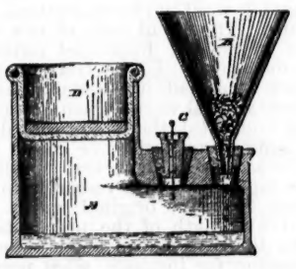
This process seems to be somewhat indefinite. No temperature is mentioned at which the opium shall macerate No temperature is mentioned for the remaining water that is to exhaust the opium. It speaks of concentrating to the bulk of one-half an ounce, but says nothing about the temperature at which this shall be done. It speaks of washing the precipitated morphine on a filter with cold water, but gives no limit. The morphine obtained by this process was quite dark colored, and it was difficult to find any crystals whatever. The morphine in this case was also dried at between 70° and 80° C., and not at 100° C., as directed by the process. Doubtless the new revision of the British Pharmacopœia will supply a much better method of assay. This process claims from 6 per cent to 8 per cent of morphine.

The morphine obtained in each case was shaken with one hundred parts of lime-water, and in no case was it completely dissolved, but in each case very nearly so, and all to the same extent.

The morphine of the U. S. P. and German Pharmacopœia was quite light in color, the U. S. P. being quite as light as the German, and the British was quite dark.

It will be seen that the U. S. P. process calls for at least 12 per cent of morphine, that the German calls for 10 per cent morphine, and that the British calls for at least 6 per cent of morphine, and that by actual experiment the U. S. P. process gave the largest yield, the German a much smaller yield, and the British the least of all.

That the morphine in each case dissolved to the same extent in lime-water, and that the morphine obtained by the U. S. P. process was much lighter colored than the British, and quite as light colored as the German, and gave a far larger yield than either of the other processes. The only inference that can be drawn from these results is that the present U. S. P. process is by far the most definite as to detail, yields by far the most morphine, and hence exhausts the opium more thoroughly than any of the other processes.



VACUUM PRESS PERCOLATOR.

CHAS. R. KNAPP, of San Francisco, is the patentee* of an apparatus for making use of atmospheric pressure for hastening percolation, a section of which is shown in the adjoining illustration. It consists of a vessel with three openings, in larger of which is an elastic diaphragm, another holds a stopper containing an outlet valve, and the third admits the nozzle of a percolating vessel. The joints being made air-tight, a weight placed upon the diaphragm causes some of the air in the vessel beneath to escape by way of the valve, and on the weight being removed, the recoil of the diaphragm causes a partial vacuum in the receiver so that the pressure of atmosphere on the surface of the liquid in the percolator materially hastens its flow.

"Hamburger Thee" consists of 32 parts of senna leaves, 16 parts of manna, 8 parts of coriander, and 1 part of tartaric acid.

* Patent 293,335.

CORRESPONDENCE.

ED. AMERICAN DRUGGIST:

In looking over the April number of the AMERICAN DRUGGIST, I noticed on page 61 an article headed "names," giving the derivation of a certain class of surnames. The subject is one of considerable interest to me, and I take the liberty of reminding you that another class of names is derived from what is or was called in England the Christian name of the father before surnames were commonly used, thus a man named Henry has a son named Matthew, know as Matthew of Henry's at the time and amongst his neighbors and afterwards all over the world as Matthew Henry. Some forty years ago, I had occasion to call upon a Richard Hodgdon, living in a village about five or six miles from Halifax in England. Supposing him well known, I naturally inquired for Mr. Hodgdon, and was surprised that no one could inform me where he lived, or even knew such a man. At length, after describing him to a persom whom I met, she exclaimed to a neighbor, Oh, he means Dick O'Toms. In the same village I read on the sign board of a stone and marble worker, an announcement commencing thus,

"Will O Mary's does live here,
Who letters grave stones far and near,
Both plain and ornamental."

Evidently a large number of names are derived as indicated above.

W. C.

WEST BUXTON, ME.

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer. Unless special instructions to the contrary accompany the query, the initials of the correspondent will be quoted at the head of each answer.

When asking for information respecting an unusual or proprietary compound, always accompany the query with all the information you may possess respecting it, and, when it can conveniently be done, send a specimen of the label.

No. 1,342.—**Incompatible Prescription** (Subscriber).

This correspondent asks us how the following prescription should be put up:

℞ Tr. Ferri Chlor.	fl.	℥	6
" Nucis Vom.	fl.	℥	3
Quininæ Sulph.	gr.		20
Potass. Iodidi.		℥	6
Syrupi.	fl.	℥	2
Tr. Iodi.	fl.	℥	1
Aquæ. q. s. ad	fl.	℥	8

M. Dessertspoonful in a little water, three times a day.

When the above are mixed, there is produced a brownish precipitate, which remains for some time suspended in the liquid. This precipitate consists of tannate of iron and free iodine. The iodide of potassium partly reacts with the chloride of iron, and forms ferrous iodide and free iodine; another portion reacts with the alkaloids, converting them into hydriodides; if the menstruum were purely aqueous, the additional presence of free iodine would cause the complete precipitation of these alkaloidal salts. But alcohol being present, they remain in solution. The tannin contained in the Nux Vomica reacts with the iron salt and produces some ferrous tannate. These are, in general, the probable changes which take place. Probably their occurrence also depends on the rotation in which the substances are mixed.

The tincture of iodine is evidently the troublesome ingredient; and we

have nothing else to suggest than to consult with the writer of the prescription and to ask him to leave it out.

Further, to produce a clear mixture, we advise to suggest to the prescriber the addition of a little citric acid and afterwards of water of ammonia; or, better still, to use the so-called tasteless tincture of iron. The latter, however, having but little, if any, excess of acid, is not so good a solvent of quinine. Hence we advise the addition of a little citric acid. The following would then be the formula:

℞ Tinct. Nucis Vom.	fl.	ʒ 3
Potass. Iodidi		ʒ 6
Syrupi	fl.	ʒ 2
Misce et adde		
Quin. Sulphat.	gr.	20
Tinct. Ferri Citro-Chlor. ("New York and Brooklyn Form.")	fl.	ʒ 6
Acidi Citrici		ʒ 1
Mixturæ adde		
Aquæ q. s. ad	fl.	ʒ 8

No. 1,343.—Veronica serpyllifolia (H. C. N.).

This is a species of Veronica which has been introduced from Europe, or may have been indigenous, according to some authorities. Gray thus describes it:

"*V. serpyllifolia* L. (Thyme-leaved Speedwell.) Much branched at the creeping base, *nearly smooth;* branches ascending and simple (2′–4′ high); leaves *ovate or oblong*, obscure crenate, *the lowest petioled* and rounded, the upper passing into lanceolate bracts; *raceme* loose; pod rounded, broader than long, obtusely notched.—Roadsides and fields; common; introduced and indigenous. May–July.—Corolla whitish, or pale blue, with deeper stripes."

Regarding its medicinal properties we have no reliable information, but we presume that this species shares the common properties of other species of Veronica, which have been regarded as diaphoretic, diuretic, expectorant, and tonic; one of them is also considered as cathartic.

No. 1,344. — Vinum Digestivum, Long (A. W.).

Long's Digestive Wine is prepared as follows:

Fresh pancreas (from hog)	200 parts.
Bicarbonate of Sodium	2 "
Pepsin	10 "
Glycerin	70 "
Sherry Wine	1,500 "

Grind the pancreas and bicarbonate of sodium together to a thin, smooth pulp and add to this 50 parts of glycerin and 900 parts of sherry wine. Mix thoroughly, set it aside in a cool place for six hours, then express and strain. To the residue add 100 parts of sherry and express again.

Mix the pepsin with the remainder of the glycerin (20 parts) and sherry wine (500 parts), and when dissolved, add the solution to the expressed liquids previously obtained.

Set aside for six days, occasionally agitating; then filter.

Dose: Half a wineglassful to be taken before and after meals.

No. 1,345.—Coca Bitters (J. T. D.).

The following recipe has been furnished us by a correspondent:

Fl. Ext. Coca	1 fl. oz.
" " Gentian	120 min.
" " Canella	60 "
" " Sweet Orange P.	40 "
" " Ginger	15 "
" " Cardamom	10 "
Simple Elixir ("N. Y. and Brooklyn Form."). q. s. ad	16 fl. oz.

No. 1,346.—Hoof-Ointment (D.).

A very good hoof-ointment, intended to be applied to hoofs of horses and cattle when the superficial layers have become brittle, dry, and fissured, is made thus:

Yellow Wax	20 parts.
Pitch	20 "
Tar	20 "
Lampblack	10 "
Suet	100 "

Melt them together with a gentle heat, and stir until cold.

No. 1,347. — Hypodermic Solution of Quinine.

Chas. N. Seltzer, M.D., of Philadelphia, writes us as follows respecting a solution of quinine for hypodermic use, which is free from the irritating properties of most of the solutions commonly used. We shall be greatly obliged if any person who may try it will inform us of the results following its use. Dr. Seltzer writes:

". . . Knowing, from having used it for the past five years, that it is less irritating, has never caused an abscess, and keeps very well; a specimen now before me being perfectly clear, after being prepared eight months. No heat is necessary for solution. Each ♏v. contains gr. i. of sulphate of quinine (gr. xij. to the ʒi.).

Sulphate of Quinine	gr. xx.
Lactic acid	♏xx.
Distilled water	q.s. ad ♏c.

Mix."

BIBLIOGRAPHY.

UNIVERSAL-PHARMAKOPOE. Eine vergleichende Zusammenstellung der zur Zeit in Europa und Nordamerika gültigen Pharmakopoeen. VON DR. BRUNO HIRSCH. Erste Lieferung, 8vo, Leipzig: Ernst Günther's Verlag, 1885.

THE present work, from the pen of the most competent authority on pharmacopœial science on the continent of Europe, will undoubtedly fill a long-felt want in pharmaceutical literature. The recent issue of new editions of several important national pharmacopœias—U. S., German, and French—has made it necessary to refer to these several works when preparations contained therein or based on the same are prescribed or called for. At the same time, however, it will require much time and research to ascertain, from the original works, the relative strength of the preparations in the different pharmacopœias, or to determine, for instance, what part or parts of a plant, and preparations made from it, may be official in one or the other. When reading foreign professional periodicals or books, the reader will often meet recipes or terms based on the pharmacopœia of the writer's country which will frequently remain obscure or unintelligible without reference to the original work. Yet actual reference to the latter is very often out of the power of the reader, since several important pharmacopœias are written in the vernacular (French, Portuguese, Spanish, Russian) or else in Latin, with which languages not every reader is familiar.

Dr. Hirsch's work affords to all who have a command of German, a concise and complete conspectus of the pharmacopœias of all civilized nations. Each title or article is so constructed as to show successively in which points the various Pharmacopœias agree, and in which they differ; critical and explanatory notes are interspersed where necessary, and great care has been taken to ensure completeness and accuracy.

The work will be published in about 12 numbers, to be issued about monthly; price, 2 marks per number.

NEW PATENTS.

[*Complete specifications and illustrations may be obtained of any one or more of the following patents by sending the number, title, name of patentee, with twenty-five cents for each copy, to the Commissioner of Patents, at Washington, D. C., together with the name and address of the person requesting the same.*]

Respirator. 301,111.—David Genese, Baltimore, Md., assignor of one-half to Dickey, Tausley & Co., same place.

Bottle Stopper. 301,139.—Morris B. Manwaring, Chicago, Ill. A bottle-stopper consisting of an ordinary bottle-cork, having its bottom and circumference entirely covered with a vulcanized rubber casing, the top of which is provided with an inwardly-projecting flange which laps over the upper edge of the cork, for holding the cork within the casing, and leaves the centre of the cork exposed for the action of the cork-screw, etc.

Bellows attachment for Barrels. 301,146.—Hardy B. Park, Dallas, Texas.

Sulphur Refining Apparatus. 301,222.—Ferdinand Dickert, Salt Lake City, Utah.

Material for Packing Bottles. 301,250.—Oliver Long, Brooklyn; assignor of one-half to Charles Schuter and Charles Forster, both of New York, N. Y.

Hollow Suppository. 301,355.—Edwin H. Gibbs, New York, N. Y.

Apparatus for Combining Anæsthetic Agents. 301,377.—Amos M. Long, Monroe, Mich.

Bitters. 301,385.—George Mitchell, Brooklyn, N. Y. An infusion and solution of Turkey rhubarb, bitter aloes, cream of tartar, pimento, and quinine in Holland gin.

Faucet Cork-Screw. 301,425.—William H. Bayles, Port Jefferson, N. Y.

Medicated Sponge Substitute. 301,443.—Joseph Sampson Gamgee, Birmingham, England, assignor to Silas Maineville Burroughs and Henry Solomon Welcome, both of London, England.

Hydrometers for Light and Heavy Liquids. 301,444.—Henry Gunth, New York, N. Y.

Lactometer. 301,445.—H'y Gunth, New York, N. Y.

Medicated Bath. 301,483.—Oliver E. Davis, Cincinnati, Ohio, assignor to Charles C. Davis, Philadelphia, Pa.

Perfumery Cabinet. 301,497.—Benjamin Franklin Hoard, New York, N. Y., assignor of one-half to Sidney C. Thompson, same place.

Vessel for Liquids. 301,576.—Benjamin J. Downs, West Sommerville, assignor to Timothy D. Baker, Trustee, Boston, Mass.

Portable Distilling Apparatus 301,636.—Lyman Smith, Kansas City, Mo.

Portable Siphon. 301,767.—William F. Stark, New York, N. Y.

Method of Refining and Deodorizing Oils and Fats. Edgar S. Wilson, Camberwell, Eng.

Swinging Demijohn and Label Holder. 301,954.—Lucien Brand, Almeda, Cal.

Bottle Stopper. 301,965.—Jefferson Davis Cotten, Gainesville, Texas. The combination of a tubular body, having its lower end closed by means of a cork, and its upper end formed into a measuring-chamber, which is adapted to be closed by a cork, to exclude dirt and dust.

Medicated Paper for Surgical or Toilet Use. 302,073.—Seth Wheeler, Albany, N. Y.

Medical Compound. 302,174. — Sophia M. Tracy, Deadwood, Dak. A compound of Peruvian bark, wild cherry bark, white oak bark, whortleberry bark, calamus root, white rock-candy, and pure whiskey.

Soda-Water Apparatus. 302,262.—Edward D. Kendall, Brooklyn, N. Y.

Cork-Screw. 302,321.—William R. Clough, Brooklyn, N. Y.

Cork-Screw. 302,331.—Charles S. Griswold, Chester, Conn., assignor of one-half to James B. Clarke and William N. Carke, Jr., of same place.

Box for Holding Dry Powdered Substances. 302,663.—William R. Miller, Baltimore, Md.

Percolator. 302,675.—Wallace Suits, Canastota, N. Y., assignor to Anna M. Suits, same place.

ASSOCIATION AND COLLEGE NOTES.

American Pharmaceutical Association.

OWING to the late day and the necessity of going to press, we cannot give space, in this number, to a full report of the proceedings of the Annual Meeting of the Association which was held at Milwaukee, Wis., Aug. 26th to 29th.

The officers and committees elected or appointed for the ensuing year, so far as the reports have reached us, are the following:

President.—John Ingalls, Georgia.

Vice-Presidents.—John A. Dadd, Wisconsin; Henry Canning, Massachusetts; C. F. Goodman, Nebraska.

Treasurer.—Chas. A. Tufts, New Hampshire.

Permanent Secretary.—John M. Maisch, Pennsylvania.

Local Secretary.—To be filled.

Reporter on Progress of Pharmacy.—C. Lewis Diehl, Kentucky.

STANDING COMMITTEE ELECTED.

Drug Market.—M. N. Kline, Chairman, Pennsylvania; W. A. Gellatly, New York; E. Waldo Cutler, Massachusetts; Daniel Myers, Ohio; William Simpson, North Carolina.

Papers and Queries.—J. U. Lloyd, Chairman, Ohio; G. W. Sloan, Indiana; W. W. Bartlett, Massachusetts.

Prize Essays.—C. Lewis Diehl, Chairman, Kentucky; H. B. Parsons, New York; Emil Scheffer, Kentucky.

Legislation.—J. M. Maisch, Chairman, Pennsylvania; S. A. D. Sheppard, Massachusetts; Edmund Bocking, West Virginia.

Members of Council, to Expire in 1887.—W. J. M. Gordon, Ohio; J. L. Lemberger, Pennsylvania; W. S. Thompson, District of Columbia.

APPOINTED COMMITTEES.

Committee on Unofficial Formulas.—Charles Rice, P. W. Bedford, W. P. DeForrest, A. Tscheppe.

The next annual meeting (1885) will be held at Pittsburg, Pa., on the second Tuesday of September. The Association decided that it was inexpedient to hold the annual meeting of 1886 at San Francisco, as had been proposed.

Several interesting papers read at the Milwaukee Meeting will be found on other pages of this number, as well as a portrait of the President elect.

National Retail Druggist Association.

THE annual meeting of this body was held at Milwaukee, Aug. 25th and 26th. Of the proceedings we can notice, in this number, only the following.

The "Campion plan" was reported to work satisfactorily, on being thoroughly tried at Philadelphia, and it was evident that a majority of the members present regarded it as the only effective measure to abolish the present trade-abuses.

A motion to officially recommend or indorse it was at first referred to the Executive Committee, and at a subsequent session such a motion was adopted.

The following officers were elected for the ensuing year.

President, Henry Canning, Boston.

Vice-Presidents, Lucius Lybrand, Nobleville, Ind.; J. B. Bond, Little Rock, Ark.; Charles A. Heinitsch, Lancaster, Pa.

Secretary, J. W. Colcord, Lynn, Mass.

Treasurer, J. D. Wells, Cincinnati.

Executive Committee, E. A. Sayre, Brooklyn, N. Y.; A. P. Brown, Camden, N. J.; L. E. Sayre, Philadelphia, Pa.; Leo Eliel, South Bend, Ind.; W. W. Bartlett, Boston, Mass.; Chas. Becker, Washington, D.C.; J. F. Moore, Baltimore, Ind.; L. C. Hopp, Cleveland, O.; F. W. Sennewald, St. Louis, Mo.; W. C. Lane, Lincoln, Neb.; John F. Pelton, York, Pa.; F. W. R. Perry, Detroit, Mich.; Gustavus Balser, New York City.

Mr. E. A. Sayre declared that he could not serve as chairman for another year, and the selection of a chairman was left to the Committee.

Michigan.—The annual meeting of the Alumni Association of the University of Michigan was held in the lecture room of the Pharmaceutical Building on June 25th.

President Parker was in the chair. Nineteen members were present, and about thirty members of the Class of '84 joined the Association.

President A. S. Parker, of Detroit, delivered his annual address, after which the principal topics of the address were discussed. The annual dinner was served at the Cook House, and after a few after-dinner speeches had been delivered, the Association again assembled at the University and listened to the annual address by A. B. Stevens, of Detroit. It was voted that a committee of three be appointed by the Chair to represent the views of the Alumni Association upon the provisions of a State pharmacy law, in case such a representation should be called for. The committee was then appointed as follows: A. B. Stevens, '75; Geo. Gundrum, '76; H. W. Calkins, '78. It was then voted, without a dissenting voice, that, in the judgment of this Association, it is not favorable to the interests of pharmacy or of pharmaceutical education to release the holders of diplomas from any examination required of others, under laws to restrict the entrance into the practice of pharmacy to competent persons.

In the evening, the members were present at the Alumni reception of all departments, at University hall.

The annual commencement of the University, embracing that of the department of pharmacy, was held on the following day, the 26th. Bishop Potter, of New York, delivered the address, and in the afternoon six hundred alumni and guests participated in the commencement dinner.

The second annual meeting of the Michigan State Pharmaceutical Association will be held in Merrill Hall, Detroit, Sept. 9th, 10th, and 11th next. Reduced rates have been granted by the railroads, and a large attendance is expected. Members are invited to bring their wives with them. The papers to be read, the commercial exhibits to be made by the leading wholesale druggists and manufacturers of the country, and the consideration of trade interests are expected to make up a very interesting programme.

The exercises will open at 2 o'clock Tuesday afternoon, Sept. 9th. Mayor Grummond will deliver the address of welcome, to which Prof. Prescott, of the University, will reply. The President's address will also be read at this meeting. The evening and Wednesday morning will be devoted to the reading of papers and the consideration of miscellaneous business. Wednesday afternoon visiting members will be given an excursion on the river by Detroit Druggists, and Parke, Davis & Co.'s laboratory will be visited. Wednesday evening trade interests will be considered until 9 o'clock. After that hour a banquet will command the time and attention of the association. Thursday morning officers will be elected, routine business finished, and the association will adjourn.

The details of arrangement are in the hands of the Detroit Pharmaceutical Association.

The committee on reception consists of Fred. Stevens, A. B. Saltzer, and Frederick Rohnert. The present officers of the association are as follows: *President*, Frank Wells, Lansing, *First Vice-President*, Isaac Watts, Grand Rapids; *Second Vice-President*; L. H. Dodd, Buchanan; *Third Vice-President*, Wm. B. Wilson, Muskegon; *Treasurer*, Wm. Dupont, Detroit; *Secretary*, Jacob Jesson, Muskegon; *Local Secretary*, A. B. Allen, Detroit. *Executive Committee*, G. W. Conter, Charlevoix; George McDonald, Kalamazoo; F. M. Alsdorf, Lansing; O. P. Safford, Flint; H. J. Brown, Ann Arbor..

Pennsylvania.—A meeting of the Luzerne County Pharmaceutical Association was held at Wilkes Barre, July 11th. Messrs. Drumm, Price, and Schobert were elected members.

The Committee on Trade Interests reported a general good feeling among the druggists, there being but one *cutter* in the county.

Indiana.—The monthly meeting of the Indianapolis Association of Pharmacists was held Wednesday evening, August 6th.

Upon motion of Geo. W. Sloan, delegates were appointed to the A. P. A. and N. R. D. A., as follows: To A. P. A.—J. N. Hurty, Jas. R. Perry, Emil Martin, and J. K. Lilly. To N. R. D. A.—F. H. Carter, George F. Traub, H. C. Pomeroy, C. H. Schad, Siegmar Muehl.

Rhode Island.—The first of the monthly meetings of the Rhode Island State Pharmaceutical Association was held in the City of Providence on Wednesday, August 6th, President W. H. Cotton occupying the chair.

The Executive Committee was authorized to revise the by-laws with a view to their publication, and report at the next quarterly meeting.

The following resolution, offered by Mr. H. I. Leith, was passed, and a committee, consisting of Messrs. William B. Blanding, A. L. Calder, and Norman M. Mason, was appointed thereon:

Whereas, It is desirable that in the interval between the decennial revisions of the Pharmacopœia a record be kept of all information and knowledge resulting from the practical use of official formulas, together with such additions and omissions as may be deemed useful in the next ensuing revision; therefore,

Resolved, That a permanent committee on the Pharmacopœia, to consist of three members, be appointed, who shall keep a current commentary thereon, and a record of all criticisms and suggestions made upon it while in practical use, with a view to its future revision; and that the chairman of this committee shall, at the Annual meetings of the Association, report in writing. And it is earnestly requested that the members generally communicate to the chairman such information and suggestions as relate to the duties of said committee.

A committee on queries, consisting of Messrs. O'Hare, Gladding, and Leith, was then appointed.

New York.—The semi-annual meeting of the Westchester County Pharmaceutical Association was held at Huguenot Hotel, New Rochelle, Thurs-

day, July 23d. All the officers and fifteen members were present.

Mr. Hart, Chairman of the Executive Committee, reported that the Association numbered thirty-five members, that being more than fifty per cent of the number of druggists in the county. Mr. Charles Henry was elected a member of the Executive Committee, to fill the place made vacant by the resignation of F. W. Henry. The Secretary was instructed to procure enough copies of the N. Y. and Brooklyn Formulary to supply each member of the Association. The meeting then adjourned to meet in Yonkers, in January next.

A company with five members has been organized, to be known as the "Flushing Pharmaceutical Company." John Hepburn was elected President, W. C. Wagner, Vice-President, and J. D. Aug. Hartz, Secretary and Treasurer.

The object of this company is to be the combined buying of staple goods in larger quantities for cash, in order to obtain the lowest prices and best discounts.

The regular semi-annual meeting of the German Apothecaries' Society was held July 10th. The Committee on Publication reported that a third edition of the New York and Brooklyn Formulary had been found necessary, as the second edition had been exhausted. Mr. E. Plath presented his resignation as a member of of the Committee, and Gustavus Ramsperger was appointed in his place.

The annual meeting of the Erie County, N. Y., Pharmaceutical Association was held at the Y. M. C. A. building, Buffalo, on Tuesday, P.M., Aug. 5th, President R. N. Smither in the chair, and twenty-three members present. The minutes of the last monthly meeting were read and approved.

Chairman Thomas, from the Committee on Trade Interests, presented his report.

President Smither read his annual report.

Secretary Hayes read his report, which shows the present membership to be eighty, an increase of seventeen during the past year.

The officers chosen for the coming year were A. C. Anthony, *President;* George Reiemann, W. G. Gregory, M.D., *Vice-President;* Neil McEachren, *Secretary;* Geo. G. Sykes, *Treasurer;* Messrs. A. C. Anthony, Neil McEachren, Geo. E. Sykes, T. M. Johnson, M.D., and J. Rieffenstahl, *Board of Trustees;* J. M. Thomas, Thomas Stoddard, and H. J. Dimond, *Board of Examiners.*

At the annual meeting of the Erie County Pharmaceutical Association, held August 5th, were elected the following: *President*, A. C. Anthony; *Vice-Presidents*, Geo. A. Reiman, W. G. Gregory, M.D.; *Secretary*, Neil McEachren; *Treasurer*, Geo. E. Sykes; *Board of Trustees*, A. C. Anthony, N. McEchran, Geo. E. Sykes, Thos. M. Johnson, M.D., J. Rieffenstahl; *Board of Examiners*, John Thomas, Thos. Stoddart, H. J. Dimond.

Wisconsin.—The fifth annual meeting of the Wisconsin State Pharmaceutical Association was held in Madison, August 5th, 6th, and 7th.

President Sumner was in the chair, and called the meeting to order at 10.30 A.M.

The Secretary reported a membership of 309 active, and 200 honorary members. On Wednesday, August 6th, Vice-President Heuber opened the session, and fourteen members were elected.

At the afternoon session, the State Board of Pharmacy made its third annual report to the Association, which showed that during the past year meetings have been held at Milwaukee, Eau Claire, Madison, and Fond du Lac, besides a special meeting at Madison to visit the school of Pharmacy at the State University. During the past year 88 candidates were examined, of whom 50 took certificates as licentiates, 14 were granted minor certificates; 24 were rejected. During the year 4 certificates as registered pharmacists were granted, and 7 minors; 14 certificates were also granted to graduates. 39 pharmacists have discontinued business, 28 have left the State, and 8 have died since the last report. At the annual meeting in Madison, April 22d last, the board elected A. H. Hollister, of Madison, president, and E. B. Heimstreet, of Janesville, secretary, for the ensuing year. The salary of the secretary was fixed at $300 per year. The few complaints during the past year have been settled without recourse to the law. The fee for the renewal of certificates was left at $1 for registered pharmacists and 50 cents for assistants. The secretary has kept a record of clerks desiring situations and proprietors desiring clerks. The board recommend some provision for a second grade or assistants' certificate. The receipts of the past year were $2,048.67, and the expenses $1,220.68, leaving a cash balance of $827.99. The number of registered pharmacists in the State is about 1,300.

Thursday morning the pharmacists again assembled, and President Sumner announced the following standing committees for the ensuing year:

Executive.—Geo. Howard, La Crosse; O. N. Falk, Stoughton; E. Saunerhering, Marquette; E. E. Hinkson, Poynette; W. G. Palmer, Janesville.

Drug Market.—Prof. F. B. Power, Madison; J. C. Huber, Fond du Lac; C. A. Avery, Madison; Otto Theile, Milwaukee; E. B. Patten, Waupun.

Queries and Papers.—F. S. Fenton, Beloit; H. C. Stearns, Janesville; H. B. Allen, Richland Centre.

Legislation.—A. H. Hollister, Madison; A. A. Pardee, Madison; Fred. Robinson, Kenosha.

Mr. F. Robinson, chairman of the Committee on Taxes, reported in favor of petitioning Congress for the abolition of the internal revenue tax on alcohol. The delegates to the A. P. A. and N. R. D. A. were named as the committee on taxes for the ensuing year, with Mr. Robinson as chairman. They are as follows: J. A. Dadd, Milwaukee; Fred. Robinson, Kenosha; F. Prentice, Janesville; George Howard, La Crosse, and E. B. Patten, Waupun.

OFFICERS ELECTED.

The following officers were chosen for the ensuing year:

President, George Howard, La Crosse; *First Vice-President*, H. J. Goddard, Chippewa Falls; *Second Vice-President*, James Morrison, New Lisbon; *Permanent Secretary*, E. B. Heimstreet, Janesville; *Local Secretary*, F. F. Prentice, Janesville; *Treasurer*, Wm. P. Clark, Milton.

The following gentlemen were named to the Governor, from whom the latter is to choose a member of the State Board of Pharmacy: John A. Dadd, Milwaukee; F. Robinson, Kenosha, and J. C. Huber, Fond du Lac.

NEW MEMBERS.

The following 32 gentlemen were admitted to membership at the several sessions.

Daniel Lynk, Cumberland; Will. A. Grimmer, Mausten; Herman A. Fisher, Baraboo; Aug. F. Fisher, Baraboo; William E. Williams, Cambria; Peter Benle, Beaver Dam; Albert G. Ellis, Brooklyn; Esau C. Ryall, Augusta; L. V. Lewis, Sun Prairie; Edwin W. Beebe, Tomah; H. J. Goddard, Chippewa Falls; K. T. Roslad, Blanchardville; A. F. Menges, Madison; O. T. Wolhiser, Collins; H. B. Newcomb, Baraboo; F. W. Bryan, Lancaster; W. B. Baxter, Lancaster; Judson Kelly, Waupun; J. A. Kaerwer, Oshkosh; C. P. Forster, Reedsburg; James R. Fitzgerald, Ironton; J. G. M. Rymning, La Crosse; W. H. Sigler, River Falls; O. A. Kropf, Madison; W. A. Axtel, Evansville; J. A. Edmand, Kendall; P. P. Cross, Sun Prairie; C. J. Linquest, Rio; A. J. Humphrey, Waterloo; S. J. Andrews, Mazomanie; F. N. Swain, Madison; C. F. Brooks, Chicago.

The annual revenue of the British Medical Association exceeds $100,000; one-half is derived from annual subscriptions of members, and nearly as much is obtained from advertisements and sales of the journal, the remainder being from interest on investments. The excess of income over expenditures in 1883 was $12,020. The Association now has over $85,000 invested in Government and railway securities.

PHARMACEUTICAL CALENDAR.—SEPTEMBER.

Additions to and Corrections of the following Calendar are solicited.

Date.	Society Meetings.	Date.	Society Meetings.
Tues. 2d.	Erie Co. (N. Y.) Pharm. Assoc. M.—Buffalo.	Thurs. 11th.	New York Germ. Apoth. Soc.
	Maryland Col. Pharm.		Lancaster Co. (Pa.) Pharm. Assoc.
	St. Joseph (Mo.) Pharm. Assoc.	Tues. 16th.	St. Joseph (Mo.) Pharm. Assoc.
	Rhode Island Chem. and Drug Clerks' Assoc. —Providence.	Thurs. 18th.	New York Col. Pharm. Supplementary Examination of Juniors.
Thurs. 4th.	Louisville (Ky.) Col. of Pharm.—Pharm. M.	Friday 19th.	Rhode Island Chem. and Drug Clerks' Assoc. —Providence.
Friday 5th.	Cleveland Pharm. Assoc.—Bimonth. M.		
	American Chem. Soc.—New York.	Mon. 22d.	New York Col. Pharm. Opening Lecture of 55th Annual Session.
Mon. 8th.	New York City Board of Pharm., 209 E. 23d street, at 3 P.M.—Examination.	Tues. 23d.	Boston (Mass.) Druggists' Assoc.
Tues. 9th.	Kings Co. (N. Y.) Pharm. Soc.—Brooklyn.	Thurs. 25th.	Kings Co. (N. Y.) Board of Pharm.—Brookl'n.
	Michigan State Pharm. Assoc. An. Meet.—Detroit. A. W. Allen, Local Secretary, 410 Grand River Ave.	Mon. 29th.	Philadelphia Col. Pharm.—Semi-A. Meet.
			New York Col. Pharm. Preliminary Exam.
	Albany Co. (N. Y.) Pharm Assoc.	Tues. 30th.	Illinois Pharm. Assoc. An. Meet. at Bloomington.
Thurs. 11th.	Newark (N. J.) Pharm. Assoc.		